



EPA Region 5 Records Ctr.



361630

REMEDIAL DESIGN WORK PLAN – APPENDIX C

HEALTH AND SAFETY PLAN

HIMCO SITE
ELKHART, INDIANA

Prepared For:
Himco Site Trust

OCTOBER 2008
REF. NO. 039611 (5)

This report is printed on recycled paper.

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) was prepared by Conestoga-Rovers & Associates (CRA) for the Himco Site located in Elkhart, Indiana (Site). This HASP is Appendix C of the Remedial Design (RD) Work Plan for the Remedial Design/Remedial Action (RD/RA) to be completed at the Site. Figure 1.1 and Figure 1.2, present the Site location and Site layout, respectively.

This HASP describes the health and safety procedures and emergency response guidelines to be implemented during field activities completed as part of the RD/RA. The Himco Site RD/RA is being completed by CRA on behalf of the Himco Site Trust.

1.1 PURPOSE

The purpose of this Site-specific HASP is to provide specific guidelines and establish procedures for the protection of personnel performing field investigation activities as described in Section 2.0 Site Operations. The information in this HASP has been developed in accordance with applicable standards and is based on information available to date. This HASP is intended to be a living document and will be revised as required during Site activities. This HASP requires:

- i) Communication of the contents of this HASP to Site personnel;
- ii) Elimination of unsafe conditions. Conditions that can contribute to an accident will be identified, and exposure to these conditions will be eliminated;
- iii) Reduction of unsafe acts. Personnel shall make a conscious effort to work safely. CRA and the contractor will maintain a high degree of safety awareness so that safety factors involved in a task become an integral part of the task; and
- iv) Frequent inspections. Regular safety inspections of the work Site, materials, and equipment by qualified persons ensure early detection of unsafe conditions. CRA and the contractor shall correct safety and health deficiencies as soon as possible, or project activities shall be suspended.

If Site personnel identify a situation that is more hazardous than anticipated, Site personnel will vacate that area and reevaluate the hazard and the levels of protection required.

2.0 SITE BACKGROUND

2.1 SITE CHARACTERIZATION AND POTENTIALLY HAZARDOUS COMPOUNDS

According to the Amended Record of Decision (ROD), the Site is a closed, unlicensed landfill located at the intersection of County Road 10 and the John Weaver Parkway (former Nappanee Street Extension) in Cleveland Township, Elkhart County, Indiana. The Site is approximately 60 acres in size, and accepted waste such as household refuse, construction rubble, medical waste, and calcium sulfate between 1960 and 1976. According to the Remedial Investigation/Feasibility Study (RI/FS) (SEC Donahue, 1996), an estimated two thirds of the waste in the landfill is calcium sulfate. The landfill was closed and covered with a 1-foot layer of sand overlying a layer of calcium sulfate in 1976.

The Site was proposed for the National Priorities List (NPL) in 1988 and was placed on the NPL in 1990. The lead Agency for the Site is United States Environmental Protection Agency (USEPA) Region 5. Indiana Department of Environmental Management (IDEM) is the support Agency.

The waste on Site is in contact with the water table. The RI/FS states that residents near the Site reported complaints of color, taste, and odor problems in shallow water supply wells as early as 1974. Deeper potable water supply wells were installed for some residents in the 1970s. High levels of sodium in these deep wells eventually lead to the requirement to supply municipal water to these residents in 1990. The presence of a clay confining layer on Site was not confirmed by investigations completed during the RI.

The Site consists of two major areas: the landfill, which is covered with calcium sulfate and a layer of sand, and the 4-acre construction debris area (CDA) located on the northern portion of seven residential and one commercial properties. Soil samples collected from the landfill and areas surrounding the landfill contained low concentrations of volatile organic compounds (VOCs) and arsenic, both of which are believed by USEPA to be associated with the Site. Polynuclear aromatic hydrocarbons (PAHs) were also detected in soil samples from the south-central portion of the landfill. Soil samples collected from the CDA during the RI contained PAHs and metals (particularly arsenic) that may be associated with CDA dumping activities. Total VOCs in waste mass gas samples collected during the RI were low. According to the reports prepared by USEPA and the US Army Corps of Engineers (Corps), soil gas samples collected east and south of the landfill contained VOCs at low concentrations, but

demonstrated that soil gas-containing VOCs is migrating from the landfill and would need to be collected.

Surface water and sediment samples collected from the three on-Site ponds during the RI revealed very limited contamination. USEPA concluded that no further action would be required for the ponds.

Groundwater on Site flows southeast in three water-bearing units. The predominant hydraulic gradient is downwards according to the Supplemental Site Investigations/Site Characterization Report (SSI/SCR) (USEPA, 2002), but may in fact be upwards, as observed regionally. Historic groundwater samples collected from the Site contained general chemistry parameters (such as sodium), low part-per-billion concentrations of volatile VOCs and sporadic detections of metals. A "hot spot" of VOCs contamination in groundwater was identified on the south side of the landfill, where seventy-one 55-gallon drums of waste, including toluene, were removed in 1992.

To date, including during post-RI sampling, only low-level groundwater contamination has been detected off Site. The RI concluded that the greatest potential for contaminant migration from the Site is through the groundwater pathway.

2.2 SCOPE OF WORK

The HASP covers the specific Site activities to be conducted by CRA and/or the contractor at the project Site including:

- i) mobilization and demobilization of personnel, equipment, materials, and supplies to and from the Site;
- ii) location and physical inspection of the previously installed Site monitoring wells and gas monitoring probes;
- iii) groundwater and surface water level measurements;
- iv) vertical aquifer sampling and monitoring well sampling;
- v) excavation of test pits and test trenches;
- vi) site surveying;
- vii) soil gas probe installation;
- viii) soil gas sampling;
- ix) Geoprobe® or drilling activities including monitoring well installation;
- x) soil sampling activities;

- xi) residential well abandonment;
- xii) municipal water supply construction;
- xiii) fenceline clearing;
- xiv) contractor oversight; and
- xv) decontamination activities.

During these activities personnel may come in contact with impacted groundwater and/or soil. If Site operations are altered or if additional tasks are assigned, this HASP will be revised to address the change in activities.

3.0 GENERAL

3.1 PERSONNEL REQUIREMENTS

All personnel conducting activities at the Site for which a reasonable potential exposure exists must be in compliance with all applicable Occupational Safety and Health Administration (OSHA) regulations, including but not limited to 29 CFR 1910 and 29 CFR 1926, and CRA and/or contractor policies and procedures. Project personnel must also be familiar with the procedures and requirements of this HASP. In the event of conflicting safety procedures/requirements, personnel shall implement safety practices that afford the highest level of safety and protection.

3.2 PROJECT MANAGEMENT AND SAFETY ORGANIZATION

CRA Project Manager– Alan Van Norman

The CRA project manager shall be responsible for the overall implementation of the HASP, and for ensuring that all health and safety responsibilities are carried out in conjunction with this project. This shall include, but is not limited to, review and approval of the HASP and consultation with the Client/Owner regarding appropriate changes to the HASP. The project manager will ensure that the project team is adequately trained to complete the work on Site in accordance with the HASP.

Site Supervisor (SS)/Site Safety Officer (SSO) – Steve Davis or Alternate

The SS/SSO, under the supervision of the project manager, shall be responsible for the communication of the HASP requirements to Site project personnel. The SS/SSO will ensure that:

- i) all necessary safety equipment is available and maintained by project personnel;
- ii) emergency services are contacted, if necessary;
- iii) forms attached to the HASP are completed and filed correctly; and
- iv) a pre-entry health and safety briefing is provided to all CRA or contractor personnel and visitors to the Site to familiarize on-Site personnel with the procedures, requirements, and provisions of this HASP.

The SS/SSO will enforce safe work practices for project employees. The SS/SSO oversees the safety of any visitors who enter the Site. The SS/SSO maintains communication with the Client Representatives and the project manager.

Other specific duties of the SS/SSO include:

- i) order the immediate shutdown of Site activities in the case of a medical emergency, unsafe condition, or unsafe practice;
- ii) designate work areas and define minimum personal protective equipment (PPE) requirements;
- iii) provide the safety equipment, PPE, and other items necessary for employees;
- iv) enforce the use of required safety equipment, PPE, and other items necessary for employee or community safety;
- v) conduct job Site inspections as a part of quality assurance for safety and health;
- vi) report safety and health concerns to Senior Regional Safety and Health Manager who are off Site and may provide assistance as necessary;
- vii) conduct the personnel safety indoctrination session which includes potential hazards, personal hygiene principles, safety equipment usage, the project specific Hazard Communication Program, emergency procedures, and the specific procedures for the field activities to be completed;
- viii) supervision of decontamination activities;
- ix) maintain the Exclusion Zone (EZ) and Contaminant Reduction Zone (CRZ);
- x) maintain the on-Site Hazard Communication Program;
- xi) ensure that all on-Site personnel have obtained the required medical examination prior to arrival at the Site, have met the OSHA training requirements, and have been fit tested for the respiratory equipment they may use; and
- xii) develops job safety analysis on an as needed basis and communicates with all affected employees.

Due to the long duration of the RD/RA and the varying activities to be conducted at the Site, the SSO will be designated at the beginning of each work phase on Site.

The SS/SSO will have, at a minimum, 3 days of on-the-job training and will be approved by the CRA Regional Health and Safety Officer to be a supervisor. The approval of the SS/SSO will be based on a review of applicable training and on-the-job experience.

Emergency Coordinator (EC)

The SS/SSO and/or the SS/SSO's designee will act as the EC. The EC will implement the emergency procedures and is responsible for the following in the event of an emergency (See Section 10 - Emergency Contingencies for additional details and information):

- i) the EC, or the EC's designee, shall immediately respond to all imminent or actual emergency situations. The EC shall notify all personnel and emergency response agencies, identify the problem, assess the health or environmental hazards, and take all reasonable measures to stabilize the situation;
- ii) the EC must take all reasonable measures necessary to ensure that fire, explosion, emission, or discharge does not occur, reoccur, or spread. These measures may include stopping operations, collecting and containing released materials, and/or removing or isolating containers; and
- iii) the EC will also be responsible for follow-up activities after the incident such as clean-up of the affected area, maintenance and decontamination of the emergency equipment, and submission of any reports.

Project Personnel Safety Responsibility

CRA personnel and the contractor personnel are responsible for their own safety as well as the safety of those around them. CRA personnel and the contractor personnel will use any equipment provided in a safe and responsible manner, as directed by their supervisor. CRA personnel and the contractor personnel will follow the policies set forth in the HASP.

Personnel are directed to take the following actions when appropriate:

- i) suspend any operations which may cause an imminent health hazard to employees, subcontractors, or others;
- ii) correct job Site hazards when possible to do so, without endangering life or health; and
- iii) report safety and health concerns to the SS/SSO.

Contractors

Contractors will be responsible for adhering to the policies set forth in the HASP. Contractors will be required to participate in the initial briefing on the requirements of the HASP and the subsequent daily safety meetings.

Authorized Visitors

Authorized visitors will be provided with all information related to the Site operations and hazards as applicable to the purpose of their visit.

4.0 TRAINING AND MEDICAL SURVEILLANCE REQUIREMENTS

All personnel conducting work at this Site with a reasonable potential for exposure to Site contaminants will have completed the appropriate health and safety training as applicable to their job tasks/duties. The required training is referenced throughout the HASP and identified within the job safety analysis forms described in Attachment A.

At a minimum, these personnel will have completed 40 hours of OSHA training and be current with their 8-hour refreshers in accordance with 29 CFR 1926.65(e). CRA personnel or the contractor personnel engaging in field activities will participate in a medical monitoring program in accordance with 29 CFR 1926.65(f).

4.1 SITE-SPECIFIC TRAINING

An initial Site-specific training session or briefing will be conducted by the SS/SSO or designee prior to commencement of work activities. During this initial training session, employees will be instructed on the following topics:

- i) personnel responsibilities;
- ii) Site-specific Hazardous Communication Program, which includes review of material safety data sheets (MSDSs) for chemicals associated with project activities;
- iii) content and implementation of the HASP;
- iv) Site hazards and controls;
- v) Site-specific hazardous procedures;
- vi) training requirements;
- vii) PPE requirements;
- viii) emergency information, including local emergency response team phone numbers, route to nearest hospital, accident reporting procedures, and emergency response procedures;
- ix) instruction in the completion of required inspections and forms; and
- x) location of safety equipment (e.g., portable eyewash, first aid kit, fire extinguishers, etc.).

At the conclusion of this training/briefing, CRA employees and their subcontractors will be required to sign an acknowledgement form (located in Attachment B) identifying that they attended the briefing.

Supplemental daily safety meetings will be conducted by the SS/SSO to discuss potential health and safety hazards associated with each new task, and necessary precautions to be taken. These meetings will be documented on the Safety Meeting Form located in Attachment B.

5.0 SITE CONTROL

5.1 EXCLUSION ZONE (EZ)

The EZ consists of the specific work area of suspected contamination. All personnel entering the EZ must use the required PPE, and must have the appropriate training and medical clearance for hazardous waste work. The EZ is the defined area where there is a possible respiratory and/or contact health hazard. The EZ will be defined by the SSO or EC prior to commencing each phase or program of work at the Site. The location of each EZ will be identified by cones, caution tape, or other appropriate means.

5.2 CONTAMINATION REDUCTION ZONE (CRZ)

The CRZ or transition area will be established to perform decontamination of personnel and equipment. All personnel entering or leaving the EZ will pass through this area to prevent any cross-contamination. Tools, equipment, and machinery will be decontaminated in a specific location. The decontamination of all personnel will be performed on Site adjacent to the EZ. Personal protective outer garments and respiratory protection will be removed in the CRZ and prepared for cleaning or disposal. This zone is the only appropriate corridor between the EZ and the support zone (SZ).

5.3 SUPPORT ZONE

The SZ is a clean area outside of the CRZ located to prevent personnel exposure to hazardous substances. Eating and drinking will be permitted in the support area only after proper decontamination. Smoking will only be permitted in the SZ if the SZ is off Site. The SZ also provides an area for the storage of equipment and supplies.

In addition to the above-identified controls, there is a fence surrounding a portion of the Site. The fence does not enclose the Site. A Site fence is scheduled to be installed as part of the RA.

6.0 HAZARD EVALUATION

This section identifies and evaluates the potential chemical, physical, and biological hazards, which may be encountered during the completion of this project. Job Safety Analysis Forms have been developed to address the hazards associated with the Site operations and are provided in Attachment A.

6.1 CHEMICAL EXPOSURE

Preventing exposure to toxic chemicals is a primary concern. Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage at the point of contact or can act systematically, causing a toxic effect at a part of the body distant from the point of initial contact. The chemical contaminants of concern at the Site are outlined in Table 2.1. The exposure routes and exposure levels for the chemical compounds of concern are outlined in Table 2.2.

Chemical exposures are generally divided into two categories: acute and chronic. Symptoms resulting from acute exposures usually occur during or shortly after exposure to a sufficiently high concentration of a contaminant. The concentration required to produce such effects varies widely from chemical to chemical. The term "chronic exposure" generally refers to exposures to "low" concentrations of a contaminant over a long period of time. The "low" concentrations required to produce symptoms of chronic exposure depend upon the chemical, the duration of each exposure, and the number of exposures. For a given contaminant, the symptoms of an acute exposure may be completely different from those resulting from chronic exposure.

For either chronic or acute exposure, the toxic effect may be temporary and reversible, or may be permanent (disability or death). Some chemicals may cause obvious symptoms such as burning, coughing, nausea, tearing eyes, or rashes. Other chemicals may cause health damage without any such warning signs (this is a particular concern for chronic exposures to low concentrations). Health effects such as cancer or respiratory disease may not become evident for several years or decades after exposure. In addition, some toxic chemicals may be colorless and/or odorless, may dull the sense of smell, or may not produce any immediate or obvious physiological sensations. Thus, a worker's senses or feelings cannot be relied upon in all cases to warn of potential toxic exposure.

The effects of exposure not only depend on the chemical, its concentration, route of entry, and duration of exposure, but may also be influenced by personal factors such as

the individual's smoking habits, alcohol consumption, medication use, nutrition, age, and sex.

An important exposure route of concern at the Site is inhalation. The lungs are extremely vulnerable to chemical agents. Even substances that do not directly affect the lungs may pass through lung tissue into the bloodstream, where they are transported to other vulnerable areas of the body. Some toxic chemicals present in the atmosphere may not be detected by human senses (i.e., they may be colorless, odorless, and their toxic effects may not produce any immediate symptoms). Respiratory protection is therefore extremely important if there is a possibility that the work Site atmosphere may contain such hazardous substances. Chemicals can also enter the respiratory tract through punctured eardrums. Where this is a hazard, individuals with punctured eardrums should be medically evaluated specifically to determine if such a condition would place them at an unacceptable risk and preclude their working at the task in question.

Direct contact of the skin and eyes by hazardous substances is another important route of exposure. Some chemicals directly injure the skin. Some pass through the skin into the bloodstream where they are transported to vulnerable organs. Abrasions, cuts, heat, and moisture enhance skin absorption. The eye is particularly vulnerable because airborne chemicals can dissolve in its moist surface and be carried to the rest of the body through the bloodstream (capillaries are very close to the surface of the eye). Wearing protective equipment, not using contact lenses in contaminated atmospheres (since they may trap chemicals against the eye surface), keeping hands away from the face, and minimizing contact with liquid and solid chemicals can help protect against skin and eye contact.

Although ingestion should be the least significant route of exposure at the Site, it is important to be aware of how this type of exposure can occur. Deliberate ingestion of chemicals is unlikely; however, personal habits such as chewing gum or tobacco, drinking, eating, smoking cigarettes, and applying cosmetics at the Site may provide a route of entry for chemicals.

The last primary route of chemical exposure is injection, whereby chemicals are introduced into the body through puncture wounds (i.e., by stepping or tripping and falling onto contaminated sharp objects). Wearing safety shoes, avoiding physical hazards, and taking common sense precautions are important protective measures against injection.

6.1.1 CHEMICAL HAZARD CONTROLS

Each contractor will control the exposure or contact with the on-Site contaminants by:

- i) Administrative and engineering controls, and where feasible, remote work methods and personal hygiene procedures;
- ii) Development of air monitoring action levels;
- iii) Skin contact with chemicals will be controlled by use of the PPE and good housekeeping procedures. The proper PPE (e.g., Tyvek®, gloves) as described in Section 7.0 shall be worn for all activities where contact with potentially harmful media or materials is anticipated;
- iv) Using respiratory protection as appropriate, in areas known to have concentrations above the specified action level for each contaminant; and
- v) Although ingestion should be the least significant route of exposure at the facility, it is important to be aware of how this type of exposure can occur. Deliberate ingestion of chemicals is unlikely; however, personal habits such as chewing gum or tobacco, drinking, eating, smoking cigarettes, and applying cosmetics at the facility may provide a route of entry for chemicals.

6.1.2 HAZARD COMMUNICATION

Personnel required to handle or use hazardous materials as part of their job duties will be trained and educated in accordance with the Hazard Communication standard. The training shall include instruction on the safe usage, and handling procedures of hazardous materials, how to read and access MSDSs, and the proper labeling requirements.

The MSDSs for chemicals in use at the Site will be available to project personnel and will be maintained on Site by the SS/SSO.

6.2 PHYSICAL HAZARDS

Physical hazards that may be present during project activities include noise, slip/trip/hit/fall injuries, heat stress/cold stress, use of material handling devices, heavy lifting, use of hand and power tools, working in close proximity to heavy equipment and excavations, and potential adverse weather conditions. Personnel will be working around operating equipment. In addition, personnel must be aware that the

protective equipment worn can limit dexterity and visibility increasing the difficulty of performing some tasks.

6.2.1 MATERIAL HANDLING AND STORAGE

Material handling and storage practices to be conducted at the project site include manual lifting of materials and possibly the use of hoisting and rigging equipment. As a rule, use mechanical means for lifting heavy loads whenever possible.

General storage practices

The basic safety requirement for storage areas is that the storage of materials and supplies shall not create a hazard. Additional general storage area practices include the following:

- Bags, containers, bundles, etc. stored in tiers shall be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
- All stacked materials, cargo, etc. shall be examined for sharp edges, protrusions, signs of damage, or other factors likely to cause injury to persons handling these objects. Defects should be corrected as they are detected.
- Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage.
- Storage areas shall have provisions to minimize manual lifting and carrying. Aisles and passageways shall provide for the movement of mechanical lifting and conveyance devices.
- Stored materials shall not block or obstruct access to emergency exits, fire extinguishers, alarm boxes, first aid equipment, lights, electrical control panels, or other control boxes.
- "NO SMOKING" signs shall be conspicuously posted, as needed, in areas where combustible or flammable materials are stored and handled.
- Cylindrical materials such as pipes and poles shall be stored in racks, or stacked on the ground and blocked.

Special precautions for hazardous or incompatible materials storage

Generally, materials are considered hazardous if they are ignitable, corrosive, reactive, or toxic. Manufacturers and suppliers of these materials must provide the recipient with

MSDSs, which describe their hazardous characteristics and give instructions for their safe handling and storage.

Many hazardous materials are incompatible, which means they form mixtures that may have hazardous characteristics not described on the individual MSDSs. The following special precautions shall be followed regarding the storage of hazardous materials:

- Based on the information available on the MSDSs, incompatible materials shall be kept in separate storage areas.
- Warning signs shall be conspicuously posted, as needed, in areas where hazardous materials are stored.

6.2.2 MANUAL LIFTING

When lifting objects, use the following proper lifting techniques:

- Feet must be parted, with one foot alongside the object being lifted and one foot behind. When the feet are comfortably spread, a more stable lift can occur and the rear foot is in a better position for the upward thrust of the lift.
- Use the squat position and keep the back straight - but remember that straight does not mean vertical. A straight back keeps the spine, back muscles, and organs of the body in correct alignment. It minimizes the compression of the guts that can cause a hernia.
- Grip is one of the most important elements of correct lifting. The fingers and the hand are extended around the object you're going to lift - using the full palm. Fingers have very little power - use the strength of your entire hand.
- The load must be drawn close, and the arms and elbows must be tucked into the side of the body. Holding the arms away from the body increases the strain on the arms and elbows. Keeping the arms tucked in helps keep the body weight centered.

The body must be positioned so that the weight of the body is centered over the feet. This provides a more powerful line of thrust and also ensures better balance. Start the lift with a thrust of the rear foot. Do not twist.

6.2.3 HAND AND POWER TOOLS

Hand Tools

- Hand tools must meet the manufacturer's safety standards.
- Hand tools must not be altered in any way.
- At a minimum, eye protection must be used when working with hand tools.
- Wrenches (including adjustable, pipe, end, and socket wrenches) must not be used when jaws are sprung to the point that slippage occurs.
- Impact tools (such as drift pins, wedges, and chisels) must be kept free of mushroom heads.
- Wooden handles must be free of splinters or cracks and secured tightly to the tool.

Power Tools

- All power tools must be inspected regularly and used in accordance with the manufacturer's instructions and the tool's capabilities.
- Electric tools must not be used in areas subject to fire or explosion hazards, unless they are approved for that purpose.
- Portable electric tools must be connected to a Ground Fault Circuit Interrupter (GFCI) when working in wet areas.
- Proper eye protection must be used when working with power tools.
- Personnel must be trained in the proper use of each specific tool.
- Any damaged or defective power tools must be immediately tagged and removed from service.

6.2.4 HEAVY EQUIPMENT AND DRILLING SAFETY

Heavy Equipment

The following practices shall be adhered to by personnel operating heavy equipment (such as excavators) and personnel working in the vicinity of heavy equipment:

- Heavy equipment is to be inspected when equipment is initially mobilized/delivered to a job site or after it is repaired and returned to service to ensure that it meets all manufacturer and OSHA specifications (e.g., fire extinguishers, backup alarms, etc.).

- Heavy equipment is to be inspected on a daily basis. Documentation of this daily pre-operational inspection is to be filed with the project files. Vendors are responsible for their own inspections.
- Heavy equipment is only to be operated by authorized, competent operators.
- Seat belts are to be provided on heavy equipment that is not designed for stand-up operation.
- Equipment/vehicles whose payload is loaded by crane, excavator, loader, etc. will have a cab shield and/or canopy to protect the operator.
- Personnel will not be raised/lowered in buckets.
- Personnel will not ride on fender steps or any place outside the cab.
- Before leaving the equipment controls, ensure that the equipment is in its safe resting position. For a backhoe, apply the parking brake, put the front loader bucket down on the ground level, and ensure that the rear excavator bucket is locked in the travel position. Bulldozers and scraper blades, loader buckets, dump bodies, and similar equipment will be fully lowered or blocked when not in use.
- Before raising any booms, buckets, etc., check for overhead obstructions.
- Employees involved in the operation shall not wear any loose-fitting clothing, which has the potential to be caught in moving machinery.
- Personnel shall wear high visibility safety vests, steel-toed shoes, safety glasses, hearing protection, and hard hats during heavy equipment operations.
- When moving heavy equipment or when working in tight quarters, a spotter should be used.

Drilling Equipment

The following practices shall be adhered to by drilling personnel:

- Equipment should be inspected daily by the operator to ensure that there are no operational problems.
- Before leaving the controls, shift the transmission controlling the rotary drive into neutral and place the feed lever in neutral. Before leaving the vicinity of the drill, shut down the drill engine.
- Before raising the mast, check for overhead obstructions.
- Before the mast of a drill rig is raised, the drill rig must first be leveled and stabilized with leveling jacks and/or cribbing. Re-level the drill rig if it settles after initial setup. Lower the mast only when the leveling jacks are down, and do not raise the leveling jack pads until the mast is lowered completely.

- Employees involved in the operation shall not wear any loose-fitting clothing, which has the potential to be caught in moving machinery.
- During freezing weather, do not touch any metal parts of the drill rig with exposed flesh. Freezing of moist skin to metal can occur almost instantaneously.
- Personnel shall wear steel-toed shoes, safety glasses, hearing protection, and hard hats during drilling operations.
- The area shall be roped off, marked, or posted to keep the area clear of pedestrian traffic or spectators.
- Personnel should be instructed in the location and use of the emergency kill switch on the drill rig.

6.2.5 EXCAVATIONS

CRA will not enter test pits or test trenches. All investigations of material from an excavation will be completed by inspecting excavation materials from the excavator bucket. Employees will not stand within 4 feet of the edge of the excavation and will monitor the air in the breathing zone.

Atmosphere Monitoring and Testing

There are three parameters by which air quality is measured: 1) oxygen concentration, 2) flammability, and 3) the presence of hazardous substances.

Employees should not be exposed to atmospheres containing less than 19.5 percent oxygen, or having a lower flammable limit greater than 10 percent, and employees should not be exposed to hazardous levels of atmospheric contaminants.

6.2.6 NOISE EXPOSURE

The exposure to high levels of noise will be minimized to the extent possible.

Exposure to noise over the OSHA action level can cause temporary impairment of hearing; prolonged and repeated exposure can cause permanent damage to hearing. The risk and severity of hearing loss increases with the intensity and duration of exposure to noise. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of accidents on Site.

Project activities that exceed the decibel range (85 dBA or above) will require the use of hearing protection, such as the case when working around drill rigs that generate excessive noise levels. Hearing protection (ear plugs/muffs) will be available to personnel and visitors that would require entry into these areas.

Control: All personnel must wear hearing protection with a Noise Reduction Rating (NRR) of at least 20 when noise levels exceed 85 dBA. When it is difficult to hear a co-worker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. All Site personnel who are exposed to noise must receive baseline and annual audiograms as well as causes and prevention of hearing loss training.

Equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, barriers or increased distance will be used to minimize worker exposure to noise, if feasible.

6.2.7 SLIP/TRIP/HIT/FALL

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. CRA or the contractor will minimize the risk by utilizing the following:

- i) spot check the work area to identify hazards;
- ii) establish and utilize a pathway which is most free of slip and trip hazards;
- iii) beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain;
- iv) carry only loads that you can see over;
- v) keep work areas clean and free of clutter, especially in storage rooms and walkways; and
- vi) communicate hazards to on-Site personnel.

6.2.8 HEAT STRESS

Recognition and Symptoms

Heat stress is caused by a number of interacting factors including environmental conditions, clothing, workload, etc., as well as the physical and conditioning characteristics of the individual. Since heat stress is one of the most common illnesses

associated with heavy outdoor work conducted with direct solar load and in particular, because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Personnel must be aware of the types and causes of heat-related illnesses and be able to recognize the signs and symptoms of these illnesses in both themselves and their co-workers.

Heat Rashes: Are one of the most common problems in hot work environments. Commonly known as prickly heat, a heat rash is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

Heat Cramps: Are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused both by too much and too little salt.

Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (plus or minus 0.3 percent NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Drinking commercially available carbohydrate-electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

Heat Exhaustion: Occurs from increased stress on various body organs due to inadequate blood circulation, cardiovascular insufficiency, or dehydration. Signs and symptoms include pale, cool, moist skin; heavy sweating; dizziness; nausea; headache, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment.

Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs

and symptoms seen in heat exhaustion are similar to those of heat stroke, which is a medical emergency.

Workers suffering from heat exhaustion should be removed from the hot environment, be given fluid replacement, and be encouraged to get adequate rest.

Heat Stroke: Is the most serious form of heat stress. Heat stroke occurs when the body's system of temperature regulation fails and the body's temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict.

Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 41°C (105.8°F). If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of workload and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.

If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The worker should be placed in a shady area and the outer clothing should be removed. The worker's skin should be wetted and air movement around the worker should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment.

Regardless of the worker's protestations, no employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or exhaustion, that person may be predisposed to additional heat injuries.

Heat Stress Safety Precautions: Heat stress monitoring and work rest cycle implementation should commence when the ambient adjusted temperature exceeds 72°F (U.S. Department of Health and Human Services/(NIOSH) Publication No. 85-115). A

minimum work rest regimen and procedures for calculating ambient adjusted temperature are described below.

<i>Adjusted Temperature⁽¹⁾</i>	<i>Work-Rest Regimen Normal Work Ensemble⁽²⁾</i>	<i>Work-Rest Regimen Impermeable Ensemble</i>
90°C (32.°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5° to 90°F (30.8°C to 32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5° to 87.5°F (28.1° to 30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5° to 82.5°F (25.3° to 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5° to 77.5°F (30.8° to 32.2°C)	After each 150 minutes of work	After each 120 minutes of work

Notes:

- (1) Calculate the adjusted air temperature (ta adj) by using this equation:

$$ta\ adj\ ^\circ F = ta\ ^\circ F + (13 \times \text{percent sunshine})$$
 Measure air temperature (ta) with a standard thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows).
- (2) A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

In order to determine if the work rest cycles are adequate for the personnel and specific Site conditions, additional monitoring of individual heart rates will be conducted during the rest cycle. To check the heart rate, count the radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one-third and maintain the same rest period.

Additionally, one or more of the following control measures can be used to help control heat stress and is mandatory if any Site worker has a heart rate (measure immediately prior to rest period) exceeding 115 beats per minute (U.S. Department of Health and Human Services/(NIOSH) Publication No. 85-115):

- i) Site workers will be encouraged to drink plenty of water and electrolyte replacement fluids throughout the day;
- ii) on-Site drinking water will be kept cool (50 to 60°F);

- iii) a work regimen that will provide adequate rest periods for cooling down will be established, as required;
- iv) all personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps;
- v) cooling devices such as vortex tubes or cooling vests should be used when personnel must wear impermeable clothing in conditions of extreme heat;
- vi) employees should be instructed to monitor themselves and co-workers for signs of heat stress and to take additional breaks as necessary;
- vii) a shaded rest area must be provided. All breaks should take place in the shaded rest area;
- viii) employees must not be assigned to other tasks during breaks;
- ix) employees must remove impermeable garments during rest periods. This includes Tyvek® garments; and
- x) all employees must be informed of the importance of adequate rest, acclimation (usually takes about 2 hours/day for 1-2 weeks to become acclimated), and proper diet in the prevention of heat stress disorders.

6.2.9 COLD STRESS

When decreased ambient air temperatures and/or wind are present during Site activities, on-Site workers can experience cold stress conditions. Cold stress can range from minor frostbite to hypothermia.

6.2.9.1 RECOGNITION AND SYMPTOMS

The signs and symptoms of cold stress are listed below. CRA and the contractor will follow their appropriate guidelines if any personnel exhibit these symptoms:

- i) **Frostbite** — Pain in the extremities and loss of manual dexterity. "Frostnip" or reddening of the tissue, accompanied by a tingling or loss of sensation in the extremities. Continuous shivering;
- ii) **Hypothermia** — Pain in the extremities and loss of manual dexterity. Severe, uncontrollable shivering. Inability to maintain level of activity. Excessive fatigue, drowsiness, irritability, or euphoria; and
- iii) **Severe Hypothermia** — clouded consciousness, low blood pressure, pupil dilation, cease of shivering, unconsciousness, and possible death.

Remove the individual to a warm, dry place. If clothing is wet, remove and replace with dry clothing. Keep the individual warm. Re-warming of the individual should be gradual to avoid stroke symptoms. Dehydration and the loss of body fluids may result in cold injury due to a significant change in blood flow to the extremities. If the individual is conscious and alert, provide warm sweet liquids. Avoid coffee and other caffeinated liquids because of diuretic and circulatory effects. Extremities affected by frostbite should be gradually warmed up and returned to normal temperature. Apply moist compresses; begin with lukewarm compresses and slowly increase the temperature as changes in skin temperature are detected. Keep the individual warm and calm; remove to a medical facility as soon as possible.

6.2.9.2 WORK PRACTICES

To reduce the adverse health affects from cold exposure CRA and the contractor will adopt the following work practices:

- i) providing adequate insulating dry clothing to maintain core temperature above 98.6°F to workers if work is performed in air temperature below 40°F (U.S. Department of Health and Human Services/(NIOSH) Publication No. 85-115). Wind chill cooling rates and the cooling power of air are critical factors. The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required;
- ii) if the air temperature is of 32°F or less, hands should be protected;
- iii) if only light work is involved and if the clothing on the worker may become wet on the job Site, the outer layer of the clothing in use should be impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outerwear should be changed, as it becomes wetted. The outer garments should include provisions for easy ventilation in order to prevent wetting of inner layer by sweat;
- iv) if available clothing does not give adequate protection to prevent cold injury, work should be modified or suspended until adequate clothing is made available, or until weather conditions improve;
- v) heated warming shelters should be available nearby (e.g., use of on-Site trailer). CRA or the contractor personnel will be encouraged to use these at regular intervals; the frequency depending on the severity of the environmental exposure. When entering the heated shelter, remove the outer layer of clothing and loosen the remainder of the clothing to permit heat evaporation;

- vi) warm sweet drinks and soups should be provided at the Site to provide caloric intake and fluid volume. The intake of coffee should be limited because of the diuretic and circulatory effect;
- vii) the weight and bulk of clothing should be included in estimating the required work performance and weights to be lifted by the worker;
- viii) implementing a buddy system in which workers are responsible for observing fellow workers for early signs and symptoms of cold stress; and
- ix) unacclimatized employees should not be required to work full-time in cold until they become accustomed to the working conditions and required protective clothing.

6.2.10 ADVERSE WEATHER CONDITIONS

The SS/SSO will decide on the continuation or discontinuation of work based on current and pending weather conditions. Electrical storms, tornado warnings, and strong winds are examples of conditions that would call for the discontinuation of work and evacuation of the Site. CRA or the contractor will not permit any work on elevated structures (e.g., ladders or tanks) during any type of electrical storm.

6.2.11 WORKING OVER OR NEAR WATER

The procedures outlined in this section are to be implemented by all CRA and subcontractor personnel when there is potential to slip or fall into water that is greater than 3 feet in depth. Additionally, these procedures are to be adhered to when water is flowing and has the potential to carry personnel away.

- When working at ground level, a 5-foot "no entry zone" can be established between the work area and the water hazard. The "no entry zone" is to be clearly defined and/or demarcated. Personnel will not be permitted to enter into this area unless the other provisions of this section are in place.
- Standard guardrails are required on any walking/working surface over or near water.
- Where guardrails are not practical due to impairment of work being performed, other types of safeguarding, such as safety harnesses, lifelines, and lanyards may be used.

- If it is not feasible to provide fall protection due to the scope of work or location, personnel will be required to wear U.S. Coast Guard-approved life jackets or buoyant work. Prior to each use and after each use, the buoyant work vests and life preservers must be inspected for defects which would affect strength and/or buoyancy. Any damaged or defective buoyant work vest or life preserver cannot be used.
- Call in or make prearranged contacts after each activity posing a drowning hazard is completed.
- If it is necessary to work on wet/slippery surfaces above water, non-slip tape or other methods are to be used to increase traction.
- Ring buoys with a minimum of 90 feet of line must be readily available for emergency operations. The distance between buoys cannot exceed 200 feet.
- Due to the anticipated scope of work, it is not expected that a life saving skiff will be necessary. However, the SS in conjunction with the Regional Safety & Health Manager (RSHM) will evaluate current Site conditions to determine if a skiff is required.

6.3 BIOLOGICAL HAZARDS

Biological hazards can include unfortunate contact with insects, poisonous plants, and reptiles. The following information provides the foundation for prevention and care during the potential contact with these hazards.

6.3.1 VEGETATION OVERGROWTH

Overgrown weeds, bushes, trees, grass and other vegetation are fire and safety hazards. There are a number of hidden hazards not immediately recognized due to the overgrowth of vegetation in areas where field activities may occur, including discarded junk, litter, and debris. Construction materials such as boards, nails, concrete, and other debris may be hidden beneath blades of tall grass, weeds, and bushes. Other hazards may include steep slopes, potholes, trenches, soft spots, dips, etc.; all dangerously concealed from the view of the individual walking or operating motorized equipment in the area. Additionally, there are biological hazards such as snakes, ticks, chiggers, and mosquitoes that breed in overgrowth conditions.

Here are some simple actions you can take:

- Assess the work area and determine if the area requires vegetation clearance. Consider that overgrowth that extends above the lowest level of motorized equipment (i.e., bumper or fender) or 6 inches above your ankle has hidden hazards that you will not be able to readily identify.
- Determine if the area is safe to walk or whether you need motorized equipment. Consider the limitations of the equipment.
- Identify slip, trip, and fall hazards and remove from the general work area. Remember to give adequate clearance so that the items being removed do not pose future hazards.
- Adequately protect yourself against the hazards by wearing boots that protect the ankles, long pants, and using insecticides.
- Consider the limitations of manual or mechanical equipment for the clearance of overgrowth, particularly the safety hazards when using sling blades, machetes, weed eaters, bush hogs, or other brush removing equipment.

Before taking any action, determine whether there are any ecological issues that would affect or prevent the removal of overgrowth in protected areas such as wetlands, wildlife habitats, or sanctuaries for endangered and/or protected species.

6.3.2 POISONOUS PLANTS

Common *Poison Ivy* grows as a small plant, a vine, and a shrub. Poison Ivy occurs in every state. The leaves always consist of three glossy leaflets. *Poison Sumac* grows as a woody shrub or small tree 5 to 25 feet tall. It usually contains nine leaves, with eight paired leaves and one on top, and is common in swampy areas. The plants are potent sensitizers and can cause a mild to severe allergic reaction, referred to as "contact dermatitis". *These plants are found in the U.S. and Canada.*

Dermatitis, in Rhus-sensitive persons, may result from contact with the milky sap found in the roots, stems, leaves, and fruit, and may be carried by contacted animals, equipment or apparel.

The best form of prevention is to avoid contact. Wearing long sleeves and gloves, and disposable clothing, such as Tyvek, is recommended in high-risk areas to avoid

exposure from contaminated apparel. Barrier creams and cleaners are also recommended.

6.3.3 INSECTS

Ticks

Ticks are blood feeding external parasites of mammals, birds, and reptiles throughout the world. Some human diseases of current interest in the United States caused by tick-borne pathogens include Lyme disease, ehrlichiosis, babesiosis, rocky mountain spotted fever, tularemia, and tick-borne relapsing fever. Lyme disease is caused by a bacterial parasite called spirochete and is spread by infected ticks that live in and near wooded areas, tall grass, and brush. The ticks that cause the disease in the Northeast and Midwest are often no bigger than a poppy seed or a comma in a newsprint. The peak months for human infection are June through October. There are many other tick borne diseases such as Rocky Mountain Spotted Fever, which can be carried by a variety of ticks. The prevention and treatment of these diseases are similar to those of Lyme disease.

Prevention

Preventative measures include wearing light-colored clothing, keeping clothing buttoned, tucking pant legs in socks, and keeping shirttails tucked in. Periodic checks for ticks should be made during the day, and especially at night. Hair should also be checked by parting it and combing through it to make sure that no ticks have attached to the scalp. Also, check clothing when it is first removed, before ticks have a chance to crawl off.

The most common repellent recommended for ticks is N,N-dimethyl-m-toluamide, or DEET. It is important to follow the manufacturer's instructions found on the container for use with all insecticides especially those containing DEET.

In general, DEET insect repellent should only be applied to clothing, not directly on the skin. Do not apply to sunburns, cuts, or abrasions. Use soap and water to remove DEET once indoors.

Removal

The best way to remove a tick is removal by tweezers. If tweezers are not available, cover your fingers (tissue paper) while grasping the tick. It is important to grasp the tick as close as possible to the site of attachment and use a firm steady pull to remove it.

When removing the tick, be certain to remove all the mouth parts from your skin so as not to cause irritation or infection. Wash hands immediately after with soap and water, and apply antiseptic to the area where tick was removed. Get medical attention if necessary.

Symptoms of Lyme Disease

The first symptoms of Lyme Disease usually appear from 2 days to a few weeks after a person is bitten by an infected tick. Symptoms usually consist of a ring-like red rash on the skin where the tick attached, and is often bulls eye like with red on the outside and clear in the center. The rash may be warm, itchy, tender, and/or "doughy" and appears in only 60 to 80 percent of infected persons. An infected person also has flu-like symptoms of fever, fatigue, chills, headaches, a stiff neck, and muscle aches and pains (especially knees). Rashes may be found some distance away from original rash. Symptoms often disappear after a few weeks.

Bees, Wasps, and Yellow Jackets

Insects that sting are members of the order Hymenoptera of the class Insecta. There are two major subgroups: aphids (honeybees, bumblebees) and vespids (wasps, yellow jackets, hornets). Aphids are docile and usually do not sting unless provoked. The stinger of the honeybee has multiple barbs, which usually detaches after a sting. Vespids have few barbs and can inflict multiple stings.

Types of stinging insects that might be encountered on this project site may include:

- Carpenter Bees
- Africanized Killer Bees
- Honeybees
- Bumblebees
- Cicada Killer Wasps
- Paper Wasps
- Mud Dauber Wasps
- Giant Hornets
- Yellow Jackets

Symptoms

If you are stung there are three types of reactions you can have, a normal, a toxic, or an allergic reaction.

- Normal reaction - only lasts a few hours and consists of pain, redness, swelling, itching, and warmth near the sting area.
- Toxic reaction - will last for several days and results from multiple stings and may cause cramps, headaches, fever, and drowsiness.

- Allergic reaction - might cause hives, itching, swelling, tightness in the chest area and a possibility of breathing difficulties, dizziness, unconsciousness, and cardiac arrest.

The stingers of many *Hymenoptera* may remain in the skin and should be removed as quickly as possible without concern for the method of removal. An ice cube placed over the sting will reduce pain; aspirin may also be useful. Persons with known hypersensitivity to such stings should carry a kit containing epinephrine in a prefilled syringe. Antihistamines may help decrease hives and angioedema. Persons who have severe symptoms of anaphylaxis, have positive venom skin test results, and are at risk for subsequent stings should receive immunotherapy regardless of age or time since anaphylaxis.

Precautions

The following precautions can help you avoid stings. Try to wear light colored clothing and shy away from dark or floral prints. Avoid wearing perfumes, hairsprays, colognes, and scented deodorants while working outside. If eating outside, keep all food and drinks covered; sweet foods and strong scents attract stinging insects as well. Never swat or swing at the insect, it is best to wait for it to leave, softly blow it away, or gently brush it aside. Seek medical attention when the reaction to a sting includes swelling, itching, dizziness or shortness of breath.

If physical control measures are not effective, use a pesticide that will have a minimal impact on both you and the environment.

Mosquitoes

Mosquitoes are common pests that can be found in any state and any work environment where warm, humid conditions exist. Mosquitoes can pass along diseases such as West Nile virus and Malaria. Several different methods can be used to control adult mosquito populations: repellants such as DEET, mosquito traps, foggers, and vegetation and water management. *Mosquitoes are found from the tropics to the Arctic Circle and from lowlands to the peaks of high mountains.*

6.3.4 POISONOUS SPIDERS

Black Widow

Black Widow spiders are not usually deadly (especially to adults) and only the female is venomous. The female spider is shiny black, usually with a reddish hourglass shape on

the underside of her spherical abdomen. Her body is about 1.5 inches long while the adult male's is approximately half that. The spider's span ranges between 1 to 3 inches. The adult males are harmless, have longer legs, and usually have yellow and red bands and spots over their back, and the young black widows are colored orange and white. The bite of a black widow is often not painful and may go unnoticed. However, the poison injected by the spider's bite can cause severe reactions in certain individuals.

Symptoms

Symptoms that may be experienced include abdominal pain, profuse sweating, swelling of the eyelids, pains to muscles or the soles of the feet, salivation and dry-mouth (alternating), and paralysis of the diaphragm. If a person is bitten, they should seek immediate medical attention. Clean the area of the bite with soap and water. Apply a cool compress to the bite location. Keep effected limb elevated to about heart level. Ask doctor if Tylenol or aspirin can be taken to relieve minor symptoms. Additional information can be obtained from the Poison Center (1-800-222-1222). *Black widows are found throughout the tropics, U.S. and Canada.*

Brown Recluse

Brown recluse spiders are usually light brown in color, but in some instances they may be darker. Brown recluse spiders are highly venomous spiders, native to the United States and found coast to coast. The brown recluse can vary in size, but some can obtain bodies of 5/8 inches in length with a leg span of 1 1/2 inches in diameter. They can be identified by their three pairs of eyes along the head area and their fiddle shaped markings on the back. Most brown recluse bites are defensive rather than offensive. They generally only bite when they feel threatened.

Symptoms

If bitten by a brown recluse, an individual may experience open, ulcerated sores, which when left untreated may become infected and cause tissue necrosis. If an individual believes a spider has bitten them, they need to seek medical attention as soon as possible. In order to minimize the occurrence of brown recluse bites, individuals should shake their clothing and shoes thoroughly, eliminate the presence of cluttered areas, and spray the building perimeters with pesticides. *Brown recluse are found throughout the U.S., Mexico, and Canada.*

6.3.5 THREATENING DOGS

If you are approached by a frightened or menacing dog:

- Do not attempt to run and don't turn your back.
- Stay quiet, and remember to breathe.
- Be still, with arms at sides or folded over chest with hands in fists.
- Slowly walk away sideways.
- Don't stare a dog in the eyes, as this will be interpreted as a threat.
- Avoid eye contact.
- If you have a jacket, you could wrap it around your arm and should he snap, take the bite harmlessly.
- Try calling its bluff. Yell "sit!", "stay!", or "go home!". You might convince the dog that you are the stronger in the situation.

6.3.6 RODENTS

Rodentia: (rats, mice, beavers, squirrels, guinea pigs, capybaras, coypu)

Rodents, or Rodentia, are the most abundant order of mammals. There are hundreds of species of rats; the most common being the black and brown rat.

The **Brown Rat** has small ears, blunt nose, and short hair. It is approximately 14 to 18 inches long (with tail). They frequently infest garbage/rubbish, slaughterhouses, domestic dwellings, warehouses, shops, supermarkets, in fact anywhere there is an easy meal and potential nesting site.

The **Black Rat** can be identified by its tail, which is always longer than the combined length of the head and body. It is also slimmer and more agile than the Norwegian or Brown rat. Its size varies according to its environment and food supply.

The **House Mouse** has the amazing ability to adapt and it now occurs more or less in human dwellings. In buildings, mice will live anywhere and they are very difficult to keep out. Mice are also totally omnivorous; in other words, they will eat anything.

Rats and mice often become a serious problem in cold winter months when they seek food and warmth inside buildings. They may suddenly appear in large numbers when

excavation work disturbs their in-ground nesting locations or their food source is changed.

There are six major problems caused by rats and mice:

1. They eat food and contaminate it with urine and excrement.
2. They gnaw into materials such as paper, books, wood, or upholstery, which they use as nest material. They also gnaw plastic, cinder blocks, soft metals such as lead and aluminum, and wiring, which may cause a fire hazard.
3. Rats occasionally bite people and may kill small animals.
4. They, or the parasites they carry (such as fleas, mites, and worms), spread many diseases such as salmonella, trichinosis, rat bite fever, Hantavirus, Weils disease, and the bubonic plague.
5. Rats can damage ornamental plants by burrowing among the roots or feeding on new growth or twigs. They also eat some garden vegetables, such as corn and squash.
6. Rats and mice are socially unacceptable. These rodents have been a problem for centuries, chiefly because they have an incredible ability to survive and are so difficult to eliminate. In addition, they are extremely compatible with human behavior and needs.

7.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE is required to safeguard Site personnel from various hazards. Varying levels of protection may be required depending on the level of contaminants and the degree of physical hazard. This section presents the various levels of protection and defines the conditions of use for each level.

7.1 LEVELS OF PROTECTION

Protection levels are determined based upon contaminants present in the work area. The specific protection levels to be employed at the Site for each work task are presented in Table 7.1.

7.1.1 LEVEL D PROTECTION

The minimum level of protection that will be required for all Site personnel will be Level D. The following equipment will be used:

- i) work clothing as prescribed by the weather;
- ii) steel toe work boots, meeting American National Standard Institute (ANSI) Z41;
- iii) safety glasses or goggles, meeting ANSI Z87;
- iv) cotton or leather work gloves;
- v) high visibility Class II safety vest (as required);
- vi) hardhat, meeting ANSI Z89; and
- vii) hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used).

7.1.2 MODIFIED LEVEL D PROTECTION

Modified Level D will be used when airborne contaminants are not present at levels of concern, but Site activities present an increased potential for skin contact with hazardous materials. Modified Level D may consist of:

- i) Tyvek® coveralls;
- ii) steel toe work boots;

- iii) vinyl or latex boots, or polyvinyl chloride (PVC) overboots;
- iv) safety glasses or goggles;
- v) hardhat;
- vi) face shield in addition to safety glasses or goggles when projectiles and/or splashing liquids pose a hazard;
- vii) nitrile gloves;
- viii) hearing protection (if necessary); and
- ix) high visibility Class II safety vest (as required).

7.1.3 LEVEL C PROTECTION

When the airborne concentration of suspected contaminants are present at sustained levels of greater than or equal to 1.0 parts per million (ppm), Level C protection will be required. This action level is driven by the presence of benzene and vinyl chloride at the Site. If it is determined that benzene and vinyl chloride are not present via low volume personal air sampling and/or colormetric tube sampling, then the action level necessitating Level C protection may be revised by the SS/SSO.

The following equipment will be used for Level C protection:

- i) full-face air purifying respirator (APR) with organic vapor/acid gas cartridges in combination with particulate filters (P-100) which are National Institute of Occupational Safety and Health (NIOSH) approved;
- ii) polyethylene coated Tyvek® suit (if liquids/splash hazards are present) or Tyvek® coveralls, ankles, and cuffs taped to boots and gloves;
- iii) nitrile gloves over nitrile sample gloves;
- iv) steel toe work boots, ANSI approved;
- v) chemical resistant neoprene boots with steel toes, or latex/PVC booties over safety toe shoes;
- vi) hardhat, ANSI approved;
- vii) hearing protection (if necessary); and
- viii) high visibility Class II safety vest (as required).

It is not anticipated that Level B protection will be required; however, if it is determined that vinyl chloride is present in worker breathing zones then Level B personal protective

equipment will be required. Level B protection will consist of Level C equipment plus supplied air respiratory protection.

7.1.4 LEVEL B PROTECTION

Level B protection will be worn when the airborne concentrations of suspended contaminants are present at sustained levels greater than 1 ppm due to the presence of organic vapors (benzene and/or vinyl chloride). It will also be required if carbon monoxide levels exceed 25 ppm. Additionally, Level B protection is required when handling, sampling, etc. intact containers (drums and tanks) where the contents are unknown.

When photoionization detector (PID) readings are encountered above 1.0 ppm in the worker's breathing zone, Level B will be utilized until we can determine what the chemical of concern is. The action level necessitating Level B protection may be revised subject to determination of the compounds triggering the Level B protection requirement.

The following equipment will be used for Level B protection:

- i) supplied air respirator (NIOSH approved). Respirators may be positive pressure-demand, self-contained breathing apparatus (SCBA), or positive pressure-demand airline respirator (with 5-minute escape bottle for immediately dangerous to life and health (IDLH) situations);
- ii) polyethylene coated Tyvek®(equipment operators) or Saranex® hooded coverall (directly exposed personnel) with ankles and cuffs taped to boots and gloves (NOTE: Kimberly Clark Kleenguard A80 Hazard-Gard II Saranex® coveralls or equivalent);
- iii) nitrile over gloves, as manufactured by Best or equivalent;
- iv) inner nitrile disposable gloves (NDEX 8005, as manufactured by Best);
- v) safety toe work boots, ANSI approved;
- vi) chemical resistant neoprene or rubber boots with steel toes, or latex/PVC booties over safety toe shoes;
- vii) hard hat, ANSI approved;
- viii) hearing protection (if necessary); and
- ix) high visibility safety vest (Type 2).

7.2 TYPES OF PERSONAL PROTECTIVE EQUIPMENT

The following types of PPE will be available for use at the Site:

- i) ***Hardhats*** - Regulated by 29 CFR Part 1910.135; specified in the ANSI Z89.1, Safety Requirements for Industrial Head Protection;
- ii) ***Face Shields, Safety Glasses, and Safety Goggles*** - Regulated by 29 CFR Part 1910.133(a); specified in ANSI Z87.1, Eye and Face Protection;
- iii) ***Hand Protection***;
- iv) ***Hearing Protection***; and
- v) ***Protective Clothing***.

7.2.1 TYPES OF PROTECTIVE MATERIAL

Protective clothing is constructed of a variety of different materials for protection against exposure to specific chemicals. No universal protective material exists. All will decompose, be permeated, or otherwise fail to protect under certain circumstances.

Fortunately most manufacturers list guidelines for the use of their products. These guidelines usually concern gloves or coveralls and, generally, only measure the rate of degradation (failure to maintain structure). It should be noted that a protective material may not necessarily degrade but may allow a particular chemical to permeate its surface. For this reason, guidelines must be used with caution. When permeation tables are available, they will be used in conjunction with degradation tables.

The following is a partial list of protective materials that may be used during this project:

- i) **Tyvek®**. Product of duPont Company. Spun-bonded, non-woven polyolefin fibers. It has reasonable tear, puncture, and abrasion resistance. Provides protection against particulate contaminants. Inexpensive and suitable for disposable garments;
- ii) **Polyethylene**. Used as a coating on polyolefin material such as Tyvek®, increasing resistance to acids, bases, and salts. Good general purpose disposable product;

- iii) **Viton®.** Offers outstanding chemical resistance and a high degree of impermeability to many strong solvents. It is a flexible material designed for handling chlorinated and aromatic solvents;
- iv) **Nitrile.** Also referred to as Buna-N, NBR, and acrylonitrile. Resists degradation by petroleum compounds, alcohols, acids, and caustics. Used in boots and gloves. Commonly available and inexpensive;
- v) **Butyl Rubber.** Resists degradation by many contaminants. Especially resistant to permeation by toxic vapors and gases. Expensive material used in boots, gloves, splash suits, aprons, and fully encapsulating suits; and
- vi) **Neoprene.** Resists degradation by caustics, acids, and alcohols. Used in boots, gloves, splash suits, and fully encapsulating suits. Considered to be a good all-around protective material.

7.2.2 DURATION OF WORK TASKS

The duration of activities involving the usage of PPE will be established by the SS/SSO based upon ambient temperature and weather conditions, the capacity of personnel to work in the designated level of PPE (heat stress) and limitations of the protective equipment (i.e., ensemble permeation rates, life expectancy of APR cartridges, etc.).

All rest breaks will be taken in a clean area [e.g., SZ] after full decontamination and PPE removal. Rest breaks will be observed based upon the heat stress monitoring guidelines presented in Section 6.2.8.

7.2.3 BUDDY SYSTEM

A buddy system shall be implemented when conducting intrusive activities on the Site. This buddy shall be able to:

- provide his or her partner with assistance;
- observe his or her partner for signs of chemical exposure or temperature stress;
- periodically check the integrity of his or her partner's protective clothing; and
- notify emergency personnel if emergency help is needed.

7.3 RESPIRATORY PROTECTION

Respiratory protection may be required to be worn by personnel conducting field activities at this Site. Personnel will follow the procedures and guidelines as described below and follow the CRA Respiratory Protection Program.

The air-purifying respirator cartridges selected for use during work at this Site are a combination organic vapor/acid gas and particulate filter cartridges, which have the ability to protect against total organic vapor concentration up to 1,000 ppm. The cartridges also contain an attached HEPA (P-100) filter, which will protect against dust, mist and fumes having a TWA greater than 0.05 mg/m³, asbestos-containing dusts and mists, and radionuclides.

A PID with an 11.7 electron volt (eV) lamp will be used to determine if organic vapors are present. A background reading will be established during each active work area. If sustained backgrounds are 1 ppm or greater, upgrade to Level C. A colorimetric tube can be used to determine if vinyl chloride is present.

Action levels to determine the level of respiratory protection necessary for organic vapors are based on the concentration of Site contaminants measured within the breathing zone. The action levels and appropriate protection are as follows:

*Sustained Organic Vapor Reading Above
Background Within Worker Breathing Zone
(ppm) when Vinyl Chloride is not Present*

Action Taken

Background	Full-Face Respirator Available
Any sustained level above background and	
≤ 5 ppm	Level C PPE
> 5 ppm	Level B PPE

* Note: The presence of vinyl chloride will require the use of supplied air.

**Note: Due to the presence of semi-volatiles on Site, personnel should don approved APR with proper cartridge if a strong odor is detected in the breathing zone.

7.3.1 RESPIRATOR FIT TEST

All personnel who may be required to wear a respirator will have been properly fit tested. Employees will have the opportunity to handle the respirators, and wear them in

normal air for a long familiarity period. Following the familiarity period, employees will test the face piece-to-face seal by use of the positive and negative pressure tests:

- i) Positive Pressure Test - with the exhaust port(s) blocked, the positive pressure of slight exhalation should remain consistent for several seconds; and
- ii) Negative Pressure Test - with the intake ports blocked, the negative pressure of slight inhalation should remain constant for several seconds.

All CRA and contractor employees are subjected to a preliminary fit test with annual fit tests thereafter in accordance with OSHA regulations 29 CFR Part 1910.134. In addition, CRA and contractor employees are also required to be medically fit to wear a respirator as determined by a licensed physician.

Air-purifying respirators shall not be worn when conditions prevent a seal of the respirator to the wearer. Such conditions may be the growth of a beard, sideburns, a skullcap that projects under the face piece or temple pieces on glasses. No one may wear a beard if it interferes with the fit of the respirator. Also, the absence of one or both dentures can seriously affect the fit of a face piece, and should be worn at all times that respirators are being used. The worker's diligence in observing these factors shall be evaluated by periodic checks.

7.3.2 CARTRIDGE CHANGES

All cartridges will be changed a minimum of once daily. Changes will also be made when personnel begin to experience increased inhalation resistance.

7.3.3 RESPIRATOR CLEANING, MAINTENANCE, AND INSPECTION

All respirators used on Site shall be cleaned and maintained in the following manner:

- i) remove filters and cartridges;
- ii) visually inspect face piece and parts, discard faulty items;
- iii) remove all elastic headbands;
- iv) remove exhalation cover and inhalation valves;
- v) wash, sanitize, and rinse face piece. Wash any parts that were removed separately;

- vi) dry the mask. Wipe face pieces and valves;
- vii) disassemble and clean the exhalation valve;
- viii) visually inspect face piece and all parts for deterioration, distortion, or other faults that might affect the performance of the respirator;
- ix) replace any questionable or faulty parts;
- x) reassemble mask and visually inspect completed assembly; and
- xi) seal mask in plastic bag.

7.4 LEVELS OF PROTECTION

The level of protection must correspond to the level of hazard known, or suspected, in the specific work area. PPE has been selected with specific considerations to the hazards associated with Site activities. The specific PPE to be used for each activity is outlined in the Job Safety Analysis Forms (Attachment A) and the Specific Personal Protection Levels Table (see Table 7.1).

8.0 AIR MONITORING

8.1 PHOTOIONIZATION DETECTORS

During the progress of sampling activities, monitoring for organic vapors will be taken by the SS/SSO as necessary using a PID equipped with an 11.7 eV lamp. A PID is a direct reading instrument which analyzes total organic vapors. The analyzer measures the concentration of trace gases present in the atmosphere by using the principle of photoionization. Photoionization occurs when an atom or molecule absorbs light of sufficient energy to cause an electron to leave and create a positive ion. The ionization potential of a molecule is that energy in eV required to free an electron. Ionization will occur when the ionization potential of a molecule is less than the energy of the photon (lamp).

The PID will be calibrated on a daily basis in accordance with the manufacturer's guidelines, and such calibrations will be recorded in the Site daily logbook. Maintenance and calibration instructions for the instrument will be kept on Site. Results of all daily air monitoring will be recorded in the Site daily logbook.

Real-time air monitoring for organic vapors will be conducted continuously during project activities that have the potential for worker exposure to chemicals of concern.

8.2 MULTI-GAS METER (LEL/O₂/H₂S/CO METERS)

The multi-gas meter is a combination oxygen, carbon monoxide, hydrogen sulfide, and combustible gas indicator, which simultaneously analyzes concentrations of each contaminant in air. When used properly, the portable oxygen indicator will read the percent oxygen in the immediate atmosphere. The normal ambient oxygen concentration is 20.9 percent at sea level. It is necessary to be apprised of such readings as they impact lower explosive limit (LEL) readings and vice versa.

The following table provides the action level for each contaminant being monitored.

<i>Parameter</i>	<i>Action Level*</i>	<i>Actions To Be Taken</i>
Oxygen	Less than 19.5 O ₂ Greater than 23.5% O ₂	Stop work and evacuate area if levels are less than 19.5% O ₂ or greater than 23.5% O ₂ .
Hydrogen Sulfide	Less than 10 ppm H ₂ S Greater than or equal to 10 ppm (ceiling) H ₂ S	Continue work and evaluate work conditions. Stop work and evacuate area if levels are greater than or equal to 10 ppm. Shut-off or eliminate any ignition sources along perimeter of site.
Carbon Monoxide	Less than 35 ppm CO Greater than or equal to 35 ppm	Continue work and evaluate work conditions. Stop work and evacuate area if levels are greater than or equal to 35 ppm.
Combustible Gas (in non-confined space entry situations)	Less than 10% LEL Greater than 10% LEL	Continue work and evaluate work conditions. Stop work and evacuate area if levels are greater than 10% LEL. Shut off or eliminate any ignition sources along perimeter of site. Consult the CRA RSHM and Project Manager.

8.3 COLORIMETRIC DETECTOR TUBES

Detector tubes are one of the most frequently used measuring methods for detecting contaminants in the work area. The reason they are used so often is that no other simple system is currently able to cover such a wide range of gases and vapors quantitatively. The major limitation of detector tubes is that their accuracy is commonly taken as within 25 percent of the true concentration of the contaminants sampled. Detector tubes are also known as "colorimetric tubes" or "indicator tubes". Detector tubes are small glass tubes filled with solid absorbents such as silica gel, activated alumina or inert granules, and impregnated with detecting chemicals through which air is aspirated at a controlled rate. Common types of Detector Tubes include: Draeger, Gastec, RAE, MSA, Sensidyne, etc.). The use of detector tubes will be determined by the SS/SSO.

9.0 DECONTAMINATION

It is the responsibility of the SS/SSO to ensure that all personnel and pieces of equipment are properly decontaminated according to the procedures outlined below.

9.1 CONTAMINATION PREVENTION

One of the most important aspects of decontamination is the prevention of the spread of contamination. CRA and the contractor will adhere to the following methods of contamination avoidance:

- i) do not walk through areas of obvious or known contamination;
- ii) do not handle or touch contaminated materials directly;
- iii) fasten all closures on suits, covering with tape if necessary;
- iv) take particular care to protect any skin injuries; and
- v) stay upwind of airborne contaminants, when possible.

9.2 PERSONAL DECONTAMINATION

CRA or the contractor will dispose of and/or decontaminate all PPE at the conclusion of each workday as described below. CRA or the contractor will decontaminate the most contaminated PPE first.

CRA or the contractor will remove all disposable equipment before meal breaks and at the conclusion of the workday and replace them with new equipment prior to commencing work. Respiratory equipment and other non-disposables will be fully decontaminated and then placed in a clean storage area. Respirator decontamination will be conducted daily as described in Section 7.3.3. CRA or the contractor personnel will inspect their respirator on a daily basis to ensure its proper operation.

9.2.1 LEVEL D/MODIFIED LEVEL D DECONTAMINATION

Level D decontamination procedures are as follows:

- i) **Step 1** - Remove all visible contamination and loose debris by washing with clean water;

- ii) **Step 2** - Remove all outer clothing that came in contact with the contamination (i.e., boot covers and outer gloves) and either dispose of in waste container or wash in detergent solution and rinse;
- iii) **Step 3** - Remove protective clothing, dispose of in waste container; and
- iv) **Step 4** - Wash and rinse hands.

9.2.2 LEVEL C DECONTAMINATION

Level C decontamination procedures are as follows:

- i) **Step 1** - Remove all visible contamination and loose debris by washing with clean water;
- ii) **Step 2** - Remove all outer clothing that came in contact with the contamination (i.e., boot covers and outer gloves) and either dispose of in waste container or wash in detergent solution and rinse;
- iii) **Step 3** - Remove protective clothing, dispose of in waste container;
- iv) **Step 4** - Remove respirator, sanitize prior to reuse;
- v) **Step 5** - Remove inner gloves, dispose of in waste container; and
- vi) **Step 6** - Wash and rinse hands with soap and water.

9.2.3 LEVEL B DECONTAMINATION

Level B decontamination procedures are as follows:

- i) **Step 1** - Remove all visible contamination and loose debris by washing with clean water;
- ii) **Step 2** - Remove all outer clothing that came in contact with the contamination (i.e., boot covers and outer gloves) and either dispose of in waste container or wash in detergent solution and rinse;
- iii) **Step 3** - Remove protective clothing, dispose of in waste container;
- iv) **Step 4** - Remove respirator, sanitize prior to reuse;
- v) **Step 5** - Remove inner gloves, dispose of in waste container; and
- vi) **Step 6** - Wash and rinse hands with soap and water.

9.2.4 EQUIPMENT DECONTAMINATION

Equipment decontamination procedures are provided in the Field Sampling Plan. A temporary decon pad with a low-volume high-pressure washer will be setup on Site during drilling/excavation operations. All decon materials will be disposed of in accordance with the Field Sampling Plan.

9.3 SANITATION

Site sanitation will be maintained according to the OSHA standards and the local Department of Health requirements.

9.4 BREAK AREA

Breaks must be taken in the SZ, away from the active work area after Site personnel go through decontamination procedures. There will be no eating, drinking, or chewing gum or tobacco in any area other than the SZ during active Site operations.

9.5 POTABLE WATER

The following rules apply for all project field operations:

- i) An adequate supply of potable water (i.e., bottled water) will be provided at each work Site. Potable water must be kept away from hazardous materials, contaminated clothing, and contaminated equipment;
- ii) If portable containers are used to dispense drinking water in lieu of bottled water, the portable containers must be able to form a secure seal, and must be equipped with a tap dispenser. Water must not be drunk directly from the container, nor dipped from the container;
- iii) Containers used for drinking water must be clearly marked and not used for any other purpose; and
- iv) Disposable cups must be supplied, and both a sanitary container for unused cups and a receptacle for disposing of used cups must be provided.

9.6 SANITARY FACILITIES

Access to facilities for washing before eating, drinking, or smoking will be provided. Alternatively, Site personnel will use off-Site facilities to wash before eating, drinking, or smoking.

9.7 LAVATORY

If permanent toilet facilities are not available, an adequate number of portable chemical toilets will be provided or arrangements will be made to allow personnel to leave the Site to go and use a necessary facility.

9.8 TRASH COLLECTION

Trash collected from the CRZ will be separated as potentially contaminated waste. Trash collected in the support and break areas will be disposed of as non-hazardous waste. Trash receptacles will be set up in the CRZ and in the SZ.

10.0 EMERGENCY RESPONSE

It is essential that Site personnel be prepared in the event of an emergency. Emergencies can take many forms: illnesses or injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather. The following sections outline the general procedures for emergencies. Emergency information should be posted as appropriate.

10.1 EMERGENCY CONTACTS

Fire:	911
Police:	911
Ambulance:	911
Hospital: Elkhart General Hospital	219-523-3141
600 East Boulevard	

Directions to the Hospital: Go South on CR 10 toward SR 19. Make a right onto SR 19. Take SR 19 South to West Lexington Avenue. Turn left onto West Lexington Avenue then right onto East Boulevard. The hospital is 0.5 miles up on the right-hand side. Figure 10.1 provides the route to the hospital. The hospital route map will be posted in a visible location inside the on-Site work trailer.

10.1.1 ADDITIONAL EMERGENCY NUMBERS

CRA Accident Reporting Number	866-529-4886
National Response Center (NRC)	800-424-8802
Agency for Toxic Substances and Disease Registry	888-422-8737 (24 Hours)
USEPA Emergency Response	800-424-8802
Underground Utilities Location Service	800-362-2764
CRA Project Manager – Alan Van Norman	519-884-0510 or 519-241-0117 (mobile)
CRA Regional Safety and Health Manager - William Doyle	734-453-5123
CRA SS/SSO - To Be Determined	

10.2 EMERGENCY EQUIPMENT AVAILABLE ON SITE

Communication Equipment

Location

Emergency Alarms/Horns (Vehicle Horn)

CRZ

Medical Equipment

OSHA Approved First Aid Kit

CRZ or Support Zone

Sized for a Minimum of 10 people

Portable Emergency Eyewash

Fire Fighting Equipment

Two 20-Pound ABC Type Dry Chemical Fire Extinguishers*

CRZ

* Note: Fire extinguishers are required to be within 25 feet of personnel during all intrusive activities (i.e., excavation and drilling). Fire extinguishers are not necessary for non-intrusive activities, except for clearing activities. During clearing activities, fire extinguishers will be mounted in each piece of mobile equipment as well as being stationed within 25 feet of the work area.

10.3 PROJECT PERSONNEL RESPONSIBILITIES DURING EMERGENCIES

10.3.1 SITE SUPERVISOR/SITE SAFETY OFFICER

As the administrator of the HASP, the SS/SSO has primary responsibility for responding to and correcting emergency situations. The SS/SSO will:

- i) Take appropriate measures to protect personnel, including withdrawal from the EZ, total evacuation and securing of the Site, or upgrading or downgrading the level of protective clothing and respiratory protection. Figure 10.2 provides the Emergency Evacuation Routes;
- ii) Take appropriate measures to protect the public and the environment including isolating and securing the Site, preventing runoff to surface waters, and ending or controlling the emergency to the extent possible;
- iii) Ensure that appropriate Federal, State, and local agencies are informed, and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. In the event of an air release of toxic materials, the local authorities should be informed in order to

assess the need for evacuation. In the event of a spill, sanitary districts and drinking water systems may need to be alerted;

- iv) Ensure that appropriate decontamination treatment or testing for exposed or injured personnel is obtained;
- v) Determine the cause of the incident and make recommendations to prevent the recurrence; and
- vi) Ensure that all required reports have been prepared.

10.4 MEDICAL EMERGENCIES

CRA or the contractor personnel will decontaminate any person who becomes ill or injured in the EZ to the maximum extent possible. If the injury or illness is minor, full decontamination will be completed and first aid administered prior to transport. If the individual's condition is serious, at least partial decontamination will be completed as much as possible without causing further harm to the individual. First aid will be administered while awaiting an ambulance or paramedics. All injuries and illnesses will immediately be reported to the SS/SSO.

CRA or the contractor personnel will bring the directions to the hospital and a list of the contaminants of concern when transporting an injured/exposed person to a clinic or hospital for treatment.

CRA or the contractor will clean or decontaminate any vehicle used to transport contaminated personnel.

10.5 FIRE OR EXPLOSION

In the event of a fire or explosion, CRA or the contractor will immediately call the local fire department. Upon their arrival, the SS/SSO or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on Site.

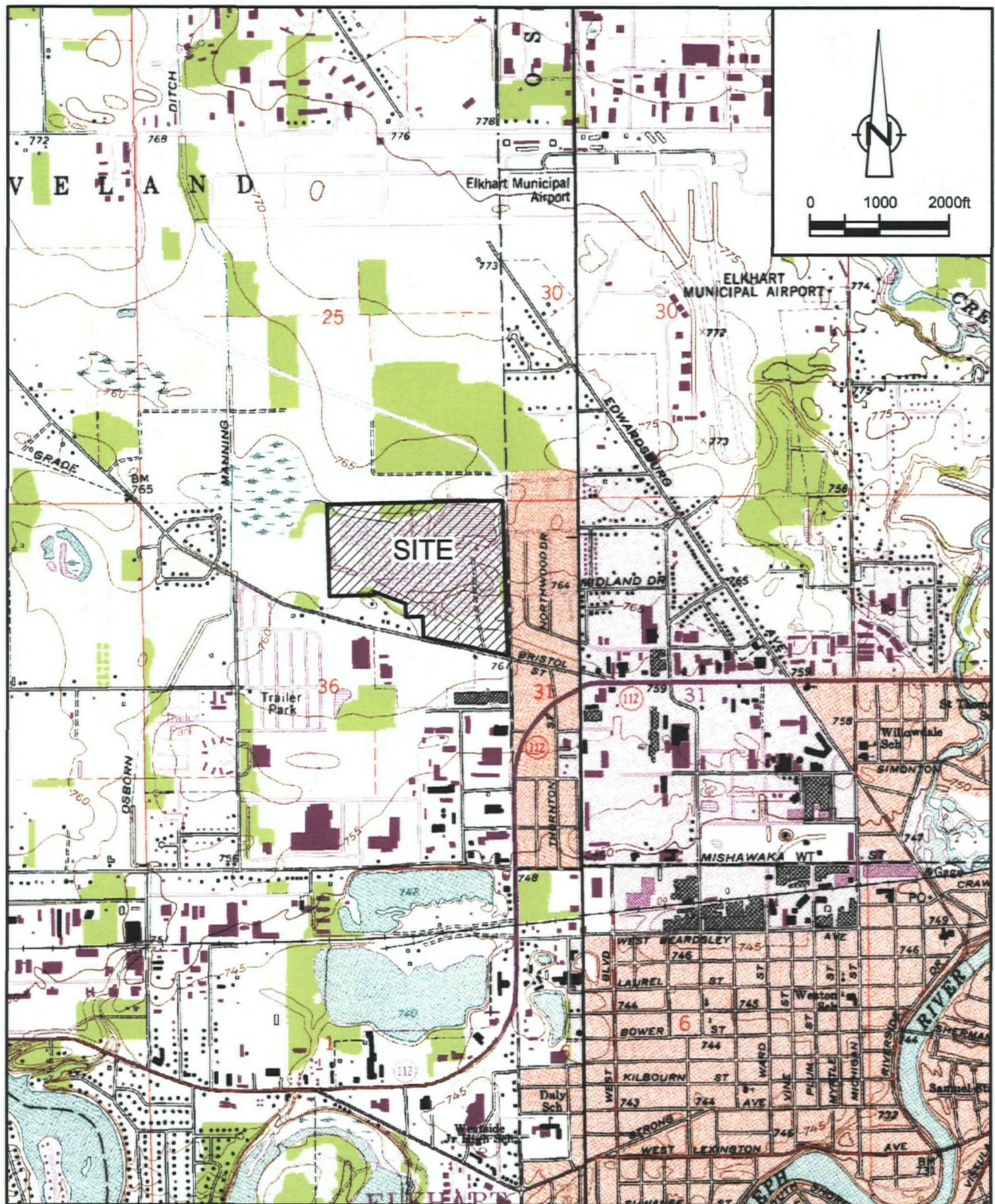
If it is safe to do so, CRA or the contractor personnel will:

- i) if hazardous, report to the Agency On-Scene Coordinator and/or Project Manager;
- ii) use fire fighting equipment available on Site; or

- iii) remove or isolate flammable or other hazardous materials which may contribute to the fire.

Any fire, explosion, or release must be immediately reported to the Agency On-Scene Coordinator and/or Project Manager as well as to Indiana Department of Environmental Management Hotline, if necessary.

FIGURES



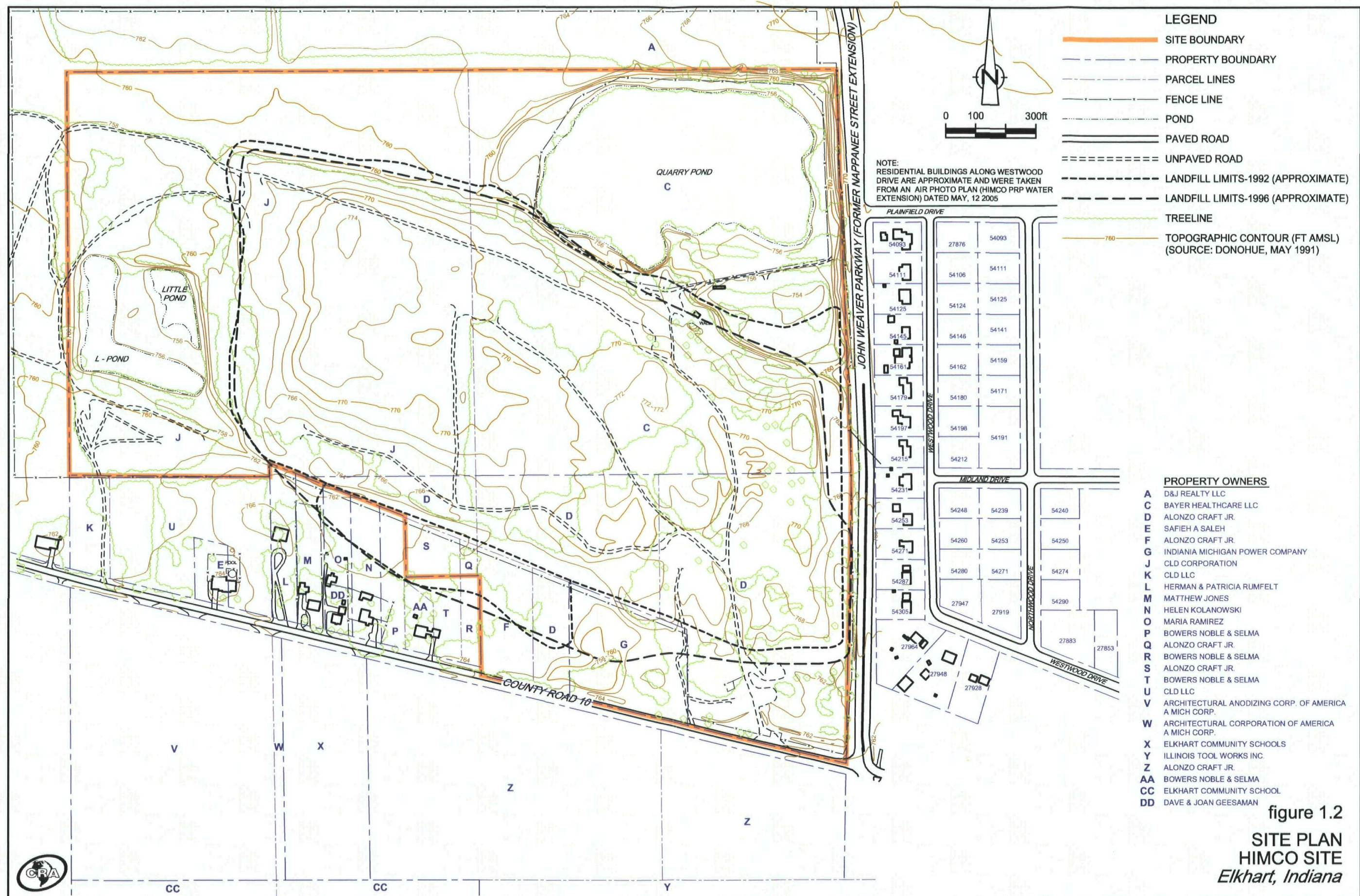
SOURCE: USGS QUADRANGLE MAPS;
ELKHART AND OSCEOLA, INDIANA



39611-00(005)GN-WA001 JAN 22/2008

figure 1.1

SITE LOCATION MAP
HIMCO SITE
Elkhart, Indiana





Start:
County Road 10 & N John W Weaver
Pkwy
 Elkhart, IN 46514, US

End:
600 East Blvd
 Elkhart, IN 46514-2483, US



SOURCE: MAPQUEST INC.



39611-00(005)GN-WA004 JAN 24/2008

figure 10.1
 HOSPITAL ROUTE MAP
 HIMCO SITE
 Elkhart, Indiana

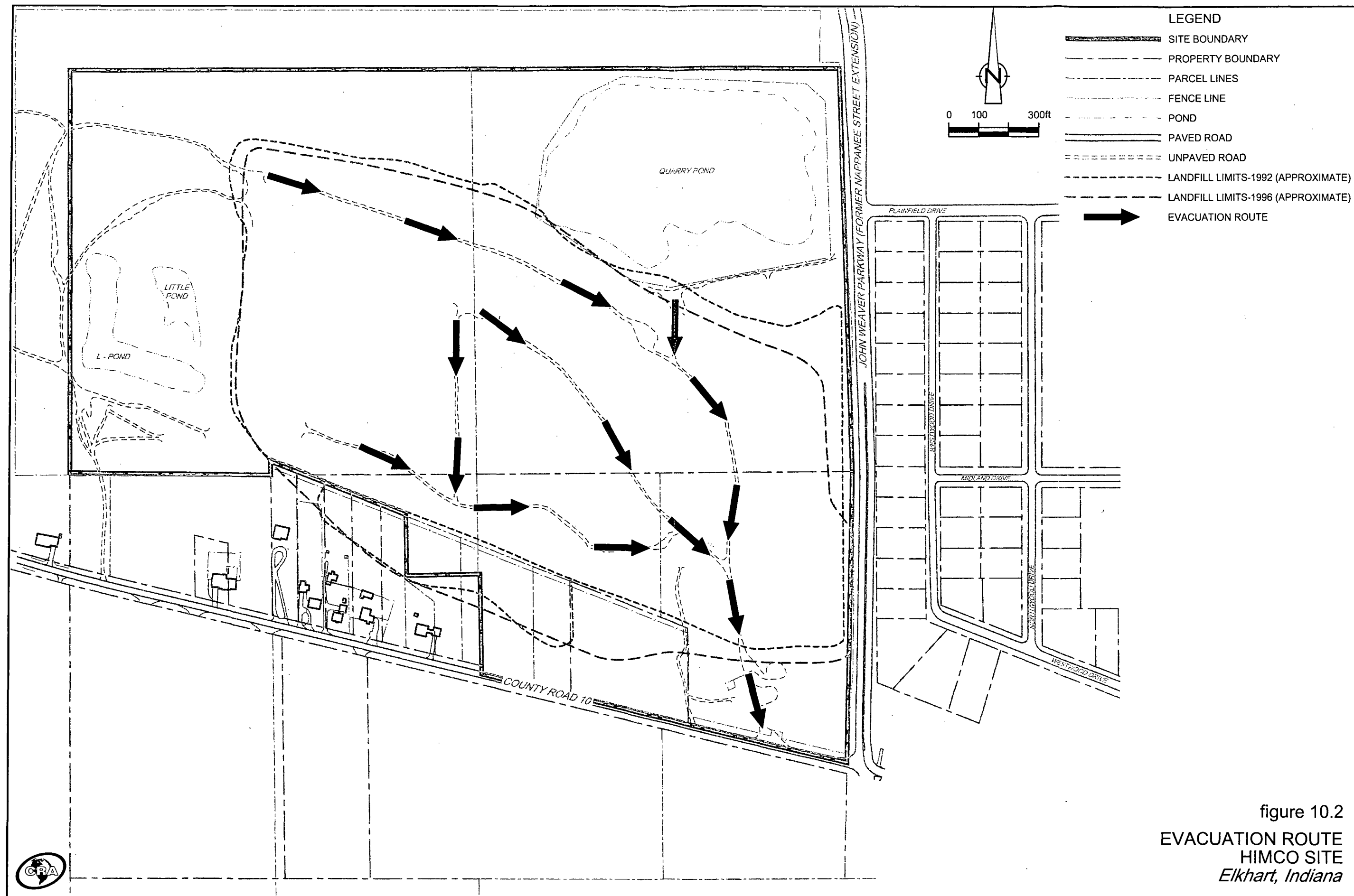


figure 10.2
EVACUATION ROUTE
HIMCO SITE
Elkhart, Indiana



TABLES

TABLE 2.1
SUMMARY OF DETECTED COMPOUNDS IN SOIL GAS, SOIL AND GROUNDWATER
HIMCO SITE
ELKHART, INDIANA

Parameter	Maximum Detected Concentration					
	Soil Gas		Soil		Groundwater	
		Units		Units		Units
Volatiles						
1,1,1-Trichloroethane	300	µg/m ³				
1,1-Dichloroethane	2400	µg/m ³	2	µg/kg	14	µg/L
1,1-Dichloroethene	1900	µg/m ³			6	µg/L
1,2-Dichlorobenzene	3.4	µg/m ³				
1,2-Dichloroethane	0.38	µg/m ³				
1,2-Dichloropropane	25	µg/m ³			4	µg/L
1,4-Dichlorobenzene	50	µg/m ³				
2-Butanone (Methyl Ethyl Ketone)	6.1	µg/m ³			106	µg/L
2-Hexanone	1.8	µg/m ³			5	µg/L
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	3.1	µg/m ³			5	µg/L
Acetone	9	µg/m ³	22	µg/kg	230	µg/L
Benzene	750	µg/m ³	4	µg/kg	15	µg/L
Bromodichloromethane					7	µg/L
Bromoform					1	µg/L
Bromomethane (Methyl Bromide)	66	µg/m ³				
Carbon disulfide	19000	µg/m ³	2	µg/kg	2	µg/L
Carbon tetrachloride	40	µg/m ³				
Chlorobenzene	51	µg/m ³				
Chloroethane	530	µg/m ³			16	µg/L
Chloroform (Trichloromethane)	280	µg/m ³			26	µg/L
Chloromethane (Methyl Chloride)	3	µg/m ³			5	µg/L
cis-1,2-Dichloroethene	4200	µg/m ³			1	µg/L
cis-1,3-Dichloropropene	0.14	µg/m ³				
Dibromochloromethane					2	µg/L
Dichlorofluoromethane					10	µg/L
Ethylbenzene	15000	µg/m ³	14	µg/kg	5	µg/L
Ethyl Ether					100	µg/L
m&p-Xylene	8500	µg/m ³				
Methylene chloride	790	µg/m ³	75	µg/kg	19	µg/L
o-Xylene	2000	µg/m ³				
Styrene	360	µg/m ³				
Tetrachloroethene	80000	µg/m ³			0.8	µg/L
Toluene	13000	µg/m ³			5	µg/L
trans-1,2-Dichloroethene	21	µg/m ³			9	µg/L
trans-1,3-Dichloropropene	0.18	µg/m ³				
Trichloroethene	21000	µg/m ³			5	µg/L
Trichlorofluoromethane (CFC-11)	370	µg/m ³				
Vinyl chloride	23000	µg/m ³			1	µg/L
Xylene (total)			9	µg/kg		
Semi-Volatiles						
1,2-Dichlorobenzene			98	µg/kg		
1,2,4-Trichlorobenzene					10	µg/L
1,4-Dichlorobenzene					7	µg/L
2-Methylnaphthalene			1000	µg/kg	0.5	µg/L
2(3H)-Benzothiazolone					23	µg/L
2,4-Dinitrotoluene					20	µg/L
4-Methylphenol			50	µg/kg	235	µg/L
Acenaphthene			890	µg/kg	25	µg/L
Acenaphthylene			2300	µg/kg		
Anthracene			4900	µg/kg	0.3	µg/L
Benzo(a)anthracene			9700	µg/kg		
Benzo(a)pyrene			11000	µg/kg		
Benzo(b)fluoranthene			9700	µg/kg		
Benzo(g,h,i)perylene			7100	µg/kg		

TABLE 2.1

**SUMMARY OF DETECTED COMPOUNDS IN SOIL GAS, SOIL AND GROUNDWATER
HIMCO SITE
ELKHART, INDIANA**

Parameter	Maximum Detected Concentration			
	Soil Gas	Soil	Groundwater	
	Units	Units	Units	Units
Benzo(k)fluoranthene		10000 µg/kg		
bis(2-Ethylhexyl)phthalate		30000 µg/kg	266	µg/L
Butyl benzylphthalate		60 µg/kg	4	µg/L
Carbazole		1500 µg/kg	6	µg/L
Chrysene		9700 µg/kg		
Dibenz(a,h)anthracene		2000 µg/kg		
Dibenzofuran		1500 µg/kg	2	µg/L
Diethyl phthalate		64 µg/kg	38	µg/L
Dimethyl phthalate			9	µg/L
Di-n-butylphthalate		95 µg/kg	15	µg/L
Di-n-octyl phthalate		130 µg/kg	4	µg/L
Fluoranthene		29000 µg/kg		
Fluorene		2500 µg/kg	3	µg/L
Indeno(1,2,3-cd)pyrene		6400 µg/kg		
Naphthalene		2200 µg/kg	2	µg/L
N-Nitrosodi-n-propylamine			9	µg/L
Phenanthrene		18000 µg/kg	0.2	µg/L
Phenol			76	µg/L
Pyrene		21000 µg/kg	13	µg/L
Metals				
Aluminum		8860 mg/kg	350000	µg/L
Antimony		13.1 mg/kg	48.7	µg/L
Arsenic		12.5 mg/kg	200	µg/L
Barium		444 mg/kg	803	µg/L
Beryllium		0.9 mg/kg	11	µg/L
Cadmium		2 mg/kg	10	µg/L
Calcium		85900 mg/kg	745000	µg/L
Chromium Total		25.1 mg/kg	461	µg/L
Cobalt		10.8 mg/kg	132	µg/L
Copper		2220 mg/kg	555	µg/L
Cyanide (total)		4.9 mg/kg	31.9	µg/L
Iron		26000 mg/kg	146000	µg/L
Lead		695 mg/kg	401	µg/L
Magnesium		22600 mg/kg	116000	µg/L
Manganese		1410 mg/kg	3590	µg/L
Mercury		27.9 mg/kg	1.4	µg/L
Nickel		298 mg/kg	422	µg/L
Potassium		586 mg/kg	38000	µg/L
Selenium		1.6 mg/kg	33	µg/L
Silver		3.1 mg/kg	19.5	µg/L
Sodium		525 mg/kg	214000	µg/L
Thallium		0.5 mg/kg	10	µg/L
Tin			55	µg/L
Vanadium		18 mg/kg	326	µg/L
Zinc		1120 mg/kg	13600	µg/L
Pesticides				
alpha-BHC			0.012	µg/L
General Chemistry				
Bromide			4100	µg/L
Sulfate			1260	mg/L

TABLE 2.2
EXPOSURE ROUTES AND EXPOSURE LEVELS
FOR THE CHEMICAL COMPOUNDS OF CONCERN
HIMCO SITE
ELKHART, INDIANA

<i>Chemical Compound</i>	<i>Ionization Potential</i>	<i>Exposure Routes</i>	<i>Acceptable Exposure Levels in Air</i>
Benzene	9.2	Inhalation, Ingestion, Skin Absorption, Human Carcinogen	0.5 ppm ⁽¹⁾ 1 ppm ⁽²⁾ 5 ppm ⁽⁴⁾ 500 ppm ⁽³⁾
Trichloroethene	9.5	Inhalation, Ingestion	50 ppm ⁽¹⁾ 100 ppm ⁽²⁾ 1000 ppm ⁽³⁾ 300 ppm ⁽⁵⁾
Tetrachloroethene	9.3	Inhalation, Ingestion, Animal Carcinogen	25 ppm ⁽¹⁾ 100 ppm ⁽²⁾ 150 ppm ⁽³⁾
Carbon Disulfide	10.1	Inhalation, Ingestion, Skin Absorption	10 ppm ⁽¹⁾ 20 ppm ⁽²⁾ 500 ppm ⁽³⁾
1,1,2-Trichloroethane	11.0	Inhalation, Ingestion, Skin Adsorption, Animal Carcinogen	10 ppm ⁽¹⁾ 100 ppm ⁽³⁾
Trans-1,2-Dichloroethene	9.8	Inhalation, Ingestion	200 ppm ⁽¹⁾ 200 ppm ⁽²⁾ 1000 ppm ⁽³⁾
Xylene	8.5	Inhalation, Ingestion	100 ppm ⁽¹⁾ 100 ppm ⁽²⁾ 900 ppm ⁽³⁾
Toluene	8.8	Inhalation, Ingestion, Skin Absorption	50 ppm ⁽¹⁾ 200 ppm ⁽²⁾ 500 ppm ⁽³⁾ 500 ppm ⁽⁶⁾
Acetone	9.7	Inhalation, Ingestion	50 ppm ⁽¹⁾ 1000 ppm ⁽²⁾ 2500 ppm ⁽³⁾
1,2-Dichlorobenzene	9.06	Inhalation, Ingestion	25 ppm ⁽¹⁾ 200 ppm ⁽³⁾

TABLE 2.2
EXPOSURE ROUTES AND EXPOSURE LEVELS
FOR THE CHEMICAL COMPOUNDS OF CONCERN
HIMCO SITE
ELKHART, INDIANA

<i>Chemical Compound</i>	<i>Ionization Potential</i>	<i>Exposure Routes</i>	<i>Acceptable Exposure Levels in Air</i>
1,2-Dichloroethene	9.8	Inhalation, Ingestion	200 ppm ⁽¹⁾ 200 ppm ⁽²⁾ 1000 ppm ⁽³⁾
1,4-Dichlorobenzene	8.98	Inhalation, Ingestion, Animal Carcinogen	10 ppm ⁽¹⁾ 150 ppm ⁽³⁾
Ethylbenzene	8.8	Inhalation, Ingestion	100 ppm ⁽¹⁾ 100 ppm ⁽²⁾ 800 ppm ⁽³⁾
Methylene Chloride	11.3	Inhalation, Ingestion, Animal Carcinogen	50 ppm ⁽¹⁾ 25 ppm ⁽²⁾ 2300 ppm ⁽³⁾
2-Butanone	9.5	Inhalation, Ingestion	200 ppm ⁽¹⁾ 200 ppm ⁽²⁾ 3000 ppm ⁽³⁾
Acenaphthene	NA	Inhalation, Ingestion	NE
Anthracene	NA	Inhalation, Ingestion	NE
Benzo(a)Anthracene	NA	Inhalation, Ingestion	NE
Chrysene	NA	Inhalation, Ingestion, Human Carcinogen	0.2 mg/m ³ ⁽¹⁾ 0.2 mg/m ³ ⁽²⁾ 80 mg/m ³ ⁽³⁾
2-Methylnaphthalene	NA	Inhalation, Ingestion	NE
2-Methylphenol	NA	Inhalation, Ingestion	NE
2-4-Dimethylphenol	NA	Inhalation, Ingestion	NE
4-Methylphenol	NA	Inhalation, Ingestion	NE
Carbazole	NA	Inhalation, Ingestion	NE
Di-n-Octylphthalate	NA	Inhalation, Ingestion	5 mg/m ³ ⁽²⁾
Dibenzo [a,h] Anthracene	NA	Inhalation, Ingestion	NE
Dibenzofuran	NA	Inhalation, Ingestion	NE

TABLE 2.2
EXPOSURE ROUTES AND EXPOSURE LEVELS
FOR THE CHEMICAL COMPOUNDS OF CONCERN
HIMCO SITE
ELKHART, INDIANA

<i>Chemical Compound</i>	<i>Ionization Potential</i>	<i>Exposure Routes</i>	<i>Acceptable Exposure Levels in Air</i>
Fluoranthene	NA	Inhalation, Ingestion	NE
Fluorene	NA	Inhalation, Ingestion	NE
Naphthalene	8.12	Inhalation, Ingestion, Skin Absorption	10 ppm ⁽¹⁾ 10 ppm ⁽²⁾ 250 ppm ⁽³⁾
4-4'-DDD	NA	Inhalation, Ingestion	NE
4-4'-DDE	NA	Inhalation, Ingestion	NE
4-4'-DDT	NA	Inhalation, Ingestion, Skin Absorption	1 mg/m ³ ⁽¹⁾ 1 mg/m ³ ⁽²⁾ 500 mg/m ³ ⁽³⁾
Alpha-Chlordane	NA	Inhalation, Ingestion	NE
Aroclors (PCBs)	NA	Inhalation, Ingestion, Skin Absorption, Suspected Human Carcinogen	0.5 mg/m ³ ⁽¹⁾ 0.5 mg/m ³ ⁽²⁾ 5 mg/m ³ ⁽³⁾
Dieldrin	NA	Inhalation, Ingestion, Skin Absorption	.25 mg/m ³ ⁽¹⁾ .25 mg/m ³ ⁽²⁾ 50 mg/m ³ ⁽³⁾
Endrin	NA	Inhalation, Ingestion, Skin Absorption	0.1 mg/m ³ ⁽¹⁾ 0.1 mg/m ³ ⁽²⁾ 2 mg/m ³ ⁽³⁾
Endrin Ketone	NA	Inhalation, Ingestion	NE
Gamma-Chlordane	NA	Inhalation, Ingestion	NE
Heptachlor Epoxide	NA	Inhalation, Ingestion, Skin Absorption, Animal Carcinogen	0.05 mg/m ³ ⁽¹⁾ 0.5 mg/m ³ ⁽²⁾ 35 mg/m ³ ⁽³⁾
Methoxychlor	NA	Inhalation, Ingestion	10 mg/m ³ ⁽¹⁾ 15 mg/m ³ ⁽²⁾ 5000 mg/m ³ ⁽³⁾

TABLE 2.2
EXPOSURE ROUTES AND EXPOSURE LEVELS
FOR THE CHEMICAL COMPOUNDS OF CONCERN
HIMCO SITE
ELKHART, INDIANA

<i>Chemical Compound</i>	<i>Ionization Potential</i>	<i>Exposure Routes</i>	<i>Acceptable Exposure Levels in Air</i>
Benzo(a) & (b)Fluoranthene	NA	Inhalation, Ingestion, Suspected Human Carcinogen	NE
Benzo(j)Fluoranthene	NA	Inhalation, Ingestion	NE
Benzo(k)Fluoranthene	NA	Inhalation, Ingestion	NE
bis(2-Ethylhexyl)Phthalate	NA	Inhalation, Ingestion	NE
Benzo(g,h,i)Perylene	NA	Inhalation, Ingestion	NE
Phenanthrene	NA	Inhalation, Ingestion	NE
Pyrene	NA	Inhalation, Ingestion	NE
Benzo(a)Pyrene	NA	Inhalation, Ingestion, Suspected Human Carcinogen	0.2 mg/m ³ (2)
Benzo(e)Pyrene	NA	Inhalation, Ingestion	NE
Indeno(1,2,3cd)Pyrene	NA	Inhalation, Ingestion	NE
Lead	NA	Inhalation, Ingestion, Animal Carcinogen	0.05 mg/m ³ (1) 0.05 mg/m ³ (2) 100 mg/m ³ (3)
Arsenic	NA	Inhalation, Ingestion, Human Carcinogen	0.01 mg/m ³ (1) 0.01 mg/m ³ (2) 10 mg/m ³ (3)
Cadmium	NA	Inhalation, Ingestion, Suspected Human Carcinogen	0.01 mg/m ³ (1) 0.005 mg/m ³ (2) 9 mg/m ³ (3)
Chromium	NA	Inhalation, Ingestion	0.5 mg/m ³ (1) 0.5 mg/m ³ (2) 250 mg/m ³ (3)
Chromium VI (Hexavalent)	NA	Inhalation, Ingestion, Human Carcinogens	0.05 mg/m ³ (1) 0.1 mg/m ³ (2) 15 mg/m ³ (3)

TABLE 2.2
EXPOSURE ROUTES AND EXPOSURE LEVELS
FOR THE CHEMICAL COMPOUNDS OF CONCERN
HIMCO SITE
ELKHART, INDIANA

<i>Chemical Compound</i>	<i>Ionization Potential</i>	<i>Exposure Routes</i>	<i>Acceptable Exposure Levels in Air</i>
Copper	NA	Inhalation, Ingestion	1 mg/m ³ ⁽¹⁾ 1 mg/m ³ ⁽²⁾ 100 mg/m ³ ⁽³⁾
Zinc	NA	Inhalation, Ingestion	NE
Mercury	NA	Inhalation, Ingestion, Skin Absorption	0.025 mg/m ³ ⁽¹⁾ 0.1 mg/m ³ ⁽⁴⁾ 10 mg/m ³ ⁽³⁾
1,1,1-Trichloroethane	11.25	Inhalation, Ingestion	350 ppm ⁽¹⁾ 350 ppm ⁽²⁾ 700 ppm ⁽³⁾
1,1-Dichloroethane	NI	Inhalation, Ingestion	NE
1,1-Dichloroethene	10.8	Inhalation, Ingestion	5 ppm ⁽¹⁾
1,2-Dichloroethane	11.05	Inhalation, Ingestion	10 ppm ⁽¹⁾ 50 ppm ⁽²⁾ 50 ppm ⁽³⁾
Carbon Tetrachloride	11.47	Inhalation, Ingestion, Skin Absorption, Suspected Human Carcinogen	5 ppm ⁽¹⁾ 10 ppm ⁽²⁾ 200 ppm ⁽³⁾
Chlorobenzene	9.07	Inhalation, Ingestion, Animal Carcinogen	10 ppm ⁽¹⁾ 75 ppm ⁽⁴⁾ 1000 ppm ⁽³⁾
Chloroethane	10.97	Inhalation, Ingestion, Skin Adsorption, Animal Carcinogen	100 ppm ⁽¹⁾ 1000 ppm ⁽²⁾ 3800 ppm ⁽³⁾
Chloroform	11.37	Inhalation, Ingestion, Animal Carcinogen	10 ppm ⁽¹⁾ 50 ppm ⁽²⁾ 500 ppm ⁽³⁾
cis-1,2-Dichloroethene	9.8	Inhalation, Ingestion	200 ppm ⁽¹⁾ 200 ppm ⁽²⁾ 1000 ppm ⁽³⁾

TABLE 2.2
EXPOSURE ROUTES AND EXPOSURE LEVELS
FOR THE CHEMICAL COMPOUNDS OF CONCERN
HIMCO SITE
ELKHART, INDIANA

<i>Chemical Compound</i>	<i>Ionization Potential</i>	<i>Exposure Routes</i>	<i>Acceptable Exposure Levels in Air</i>
Trifluorotrichloroethane	NI	Inhalation, Ingestion	NE
Total Petroleum Hydrocarbons	NI	Inhalation, Ingestion	NE
Vinyl chloride	9.99	Inhalation, Ingestion, Human Carcinogen	1 ppm ⁽¹⁾ 1 ppm ⁽²⁾ 5 ppm ⁽⁴⁾
1-Methylnaphthalene	NI	Inhalation, Ingestion	NE
Benzoic acid	NI	Inhalation, Ingestion	NE
Phenol	8.69	Inhalation, Ingestion, Skin Absorption	5 ppm ⁽¹⁾ 5 ppm ⁽²⁾ 250 ppm ⁽³⁾
Aluminum	NA	Inhalation, Ingestion	10 mg/m ³ ⁽¹⁾
Antimony	NA	Inhalation, Ingestion	0.5 mg/m ³ ⁽¹⁾ 0.5 mg/m ³ ⁽²⁾ 50 mg/m ³ ⁽³⁾
Barium	NA	Inhalation, Ingestion	0.5 mg/m ³ ⁽¹⁾ 0.5 mg/m ³ ⁽²⁾ 50 mg/m ³ ⁽³⁾
Beryllium	NA	Inhalation, Ingestion, Human Carcinogen	0.002 mg/m ³ ⁽¹⁾ 0.002 mg/m ³ ⁽²⁾ 0.005 mg/m ³ ⁽⁴⁾
Calcium	NA	Inhalation, Ingestion	NE
Cobalt	NA	Inhalation, Ingestion	0.02 mg/m ³ ⁽¹⁾ 0.1 mg/m ³ ⁽²⁾ 20 mg/m ³ ⁽³⁾
Iron	NA	Inhalation, Ingestion	NE
Magnesium	NA	Inhalation, Ingestion	NE
Manganese	NA	Inhalation, Ingestion	NE

TABLE 2.2
EXPOSURE ROUTES AND EXPOSURE LEVELS
FOR THE CHEMICAL COMPOUNDS OF CONCERN
HIMCO SITE
ELKHART, INDIANA

<i>Chemical Compound</i>	<i>Ionization Potential</i>	<i>Exposure Routes</i>	<i>Acceptable Exposure Levels in Air</i>
Molybdenum	NA	Inhalation, Ingestion, Animal Carcinogen	0.5 mg/m ³ ⁽¹⁾ 5 mg/m ³ ⁽²⁾
Nickel	NA	Inhalation, Ingestion	1.5 mg/m ³ ⁽¹⁾
Potassium	NA	Inhalation, Ingestion	NE
Selenium	NA	Inhalation, Ingestion	0.2 mg/m ³ ⁽¹⁾ 0.2 mg/m ³ ⁽²⁾ 1 mg/m ³ ⁽³⁾
Silver	NA	Inhalation, Ingestion	0.1 mg/m ³ ⁽¹⁾ 0.01 mg/m ³ ⁽²⁾ 10 mg/m ³ ⁽³⁾
Sodium	NA	Inhalation, Ingestion	NE
Thallium	NA	Inhalation, Ingestion	0.1 mg/m ³ ⁽¹⁾ 0.1 mg/m ³ ⁽²⁾ 15 mg/m ³ ⁽³⁾
Vanadium	NA	Inhalation, Ingestion	NE

Notes:

- (1) 2005 Values, American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs).
- (2) Federal Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL).
- (3) Immediately Dangerous to Life and Health (IDLH).
- (4) Federal OSHA 15 minute ceiling standard.
- (5) Federal OSHA 5 minute exposure limit.
- (6) Federal OSHA 10 minute exposure limit.
- mg/m³ Milligrams per Cubic Meter.
- NA Not Applicable.
- NE Not Established.
- NI No Information.
- ppm Parts Per Million.

TABLE 7.1
SPECIFIC PERSONAL PROTECTION LEVELS
HIMCO SITE
ELKHART, INDIANA

<i>Work Task</i>	<i>Maximum Protection Level ⁽¹⁾</i>	<i>Alternate Protection Level ⁽²⁾</i>
Mobilization and Demobilization of Labor, Materials, and Equipment to and from the Site	Modified D	Level D
Groundwater Sampling	Level B	Level D
Soil Sampling Activities	Level B	Level D
Excavation of Test Pits	Level B	Modified D
Site Surveying	Level B	Level D
Soil Gas Sampling	Level B	Level D
Soil Gas Probe/Well Installation	Level B	Level D
Subcontractor Oversight	Level B	Level D
Decontamination Activities	Level B	Level D

Notes:

Specific requirements for protection levels are detailed in Section 7.0.

- ⁽¹⁾ Level B: To be worn when the criteria for using supplied air (SARs) are met, (vinyl chloride) and a greater level of skin protection is needed.
Level C: to be worn when the criteria for using air purifying respirators (APR) are met, and a greater level of skin protection is needed
Modified D: To be worn when dermal protection is required, however, no respiratory hazards are present. It provides minimal protection against chemical hazards.
- ⁽²⁾ Alternate protection levels will be used if monitoring indicates that conditions are appropriate or the SS/SSO determines that there is a reduced potential of exposure.



A

ATTACHMENT A

JOB SAFETY ANALYSIS FORMS



Job Safety Analysis (JSA)

JSA Filename: JSA Basic Mobilization/Demobilization Activities



Safety Means Awareness
Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	January 24, 2008	JSA Type	Mobilization and Demobilization
Work Type	General	Client	HIMCO Site Trust
Work Activity	Mobilization and demobilization of equipment and individuals to and from site.		
Work Site	Elkhart, Indiana		
Key Equipment			
Task-specific Training	Motor Vehicle Safety		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)

<input type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER* _____
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____

ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below

Gloves as appropriate.

Development Team	Position/Title	Reviewed By	Position/Title	Date
Lindsay Johnson	Peer Reviewer	Greg Smiley	Safety Professional	January 25, 2008



Job Safety Analysis (JSA)

JSA Filename: JSA Basic Mobilization/Demobilization Activities



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Discuss STAR (Stop Think Assess & Review) and Stop Work Authority (SWA)	Site personnel not aware of STAR & SWA	<ul style="list-style-type: none">Project team (CRA) discusses importance of and documentation procedures for SWA during pre-job safety meeting. Use SWA to stop any work that is unsafe.	All Personnel
2	Check weather	Unexpected storm; Fog; Rain; Snow; Lightening/Thunder; Heat/Cold stress	<ul style="list-style-type: none">Check local weather forecast. Discuss weather issues and precautions to take while driving and on-site during the pre-job safety meeting. If weather conditions (e.g. fog, rain, snow, etc.) impair the ability/vision of the driver, exit at nearest safe location and assess the situation. While on-site, at first sign of lightening/thunder utilize SWA and assess weather conditions. In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g. canopy, fan, glove warmers).	All Personnel
3	Load equipment into vehicle	Back strain; Cuts; Pinch points; Hand/Foot injury; Forgotten equipment; Damaged equipment	<ul style="list-style-type: none">Use proper lifting techniques and buddy system if needed. Wear leather/cotton gloves and avoid placing hands/fingers in pinch point locations. Wear steel toe boots. Verify requested equipment against warehouse form. Load equipment in an organized manner to prevent shifting during transport or use cargo netting.	All Personnel
4	Complete CRA Daily Vehicle Checklist	Damaged vehicle lights, tires, windows, mirrors, horn; Inadequate vehicle documents and/or safety items	<ul style="list-style-type: none">Check for fluid leaks under vehicle. Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers. Visually check the pressure/wear of tires. Ensure the vehicle has a spare tire. Assure windshield and window glass is clean and free from obstructions. Test the windshield wipers and horn. Verify vehicle registration, insurance card, and inspection sticker is present and valid. Ensure the vehicle contains a first aid kit, fire extinguisher, and road hazard kit.	All Personnel
5	Check and adjust seat, steering wheel, headrest, and mirrors	Back/body strain; Blind spots; Impaired vision.	<ul style="list-style-type: none">Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach. Ensure mirrors are properly adjusted.	All Personnel
6	Fasten seat belt(s) and ensure passenger(s) seat belts are fastened	Serious injury, ejection, or death from collision and/or traffic citation	<ul style="list-style-type: none">Verify driver and passenger(s) seat belts are in good condition and properly latched.	All Personnel



Job Safety Analysis (JSA)

JSA Filename: JSA Basic Mobilization/Demobilization Activities



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
7	Ensure vehicle doors are locked	Serious injury, ejection, or death from collision; Unwanted intrusion; Lost equipment	<ul style="list-style-type: none">Manually lock all doors to vehicle.	All Personnel
8	Start engine and check gauges and warning lights	Vehicle breakdown	<ul style="list-style-type: none">Verify sufficient fuel and other hazard lamps (e.g. battery, oil, and temperature) are not lit.	All Personnel
9	Mobilize to site	Arriving late; Collision; Injury or Death to occupants or other parties	<ul style="list-style-type: none">Do not use cell phones or perform other distracting activities while vehicle is in motion. Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs. stale). Maintain safety cushion around vehicle (front, sides, and rear) and 4 second following distance. Utilize all driving defensive techniques.	All Personnel
10	Arrive at site	Pedestrian injury; Collision	<ul style="list-style-type: none">Maintain awareness of pedestrian/vehicular traffic when entering site and traveling to work zone.	All Personnel
11	Park vehicle	Pedestrian injury; Collision; Property damage	<ul style="list-style-type: none">Maintain awareness of pedestrian/vehicular traffic. Park vehicle in pull-through parking space or facing the exit. Use caution and mirrors/spotter when backing vehicle.	All Personnel
12	Demobilization	Collision; Injury or Death to occupants or other parties	<ul style="list-style-type: none">Perform perimeter vehicle check. Maintain awareness of pedestrian/vehicular traffic when exiting site. Utilize defensive driving techniques. Complete post-departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency.	All Personnel

¹ Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: JSA Bull Dozer Operations



Safety Means Awareness
Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	May 8, 2007	JSA Type	Construction
Work Type	Environmental Construction	Client	HIMCO Site Trust
Work Activity	Bull Dozer to move equipment and tow/pull stuck equipment and vehicles		
Work Site	Elkhart, Indiana		
Key Equipment	Bull Dozer to move equipment and tow/pull stuck equipment and vehicles		
Task-specific Training	Heavy equipment operations, equipment fueling		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER*
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER*
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Class II reflective vests, leather gloves			

Development Team	Position/Title	Reviewed By	Position/Title	Date
1. Jeffrey Maranciak	RSHM			
2. Don Osterhout	PM			
3. Steve Corning	Site Supervisor			



Job Safety Analysis (JSA)

JSA Filename: JSA Bull Dozer Operations



Safety Means Awareness.
Responsibility. Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Perform STAR Process- Refer to the equipment manufacturer's operating manual before using any machinery	Slips, trips, falls; situational risks - use STAR; short service employees	<ul style="list-style-type: none">• Verify personnel training is sufficient for scheduled task(s). Is Job Instruction (hands-on) Training necessary?	All Personnel
2	Daily inspection report while inspecting machine	Equipment problems; PPE failure	<ul style="list-style-type: none">• Don all necessary PPE; trained on inspection procedures.	Bull Dozer Operator
3	Transporting the equipment to the work area	Backing into or running over objects	<ul style="list-style-type: none">• Walk around the equipment or use a spotter when necessary.	Bull Dozer Operator
4	Hooking up to the necessary equipment	Cuts; pinched fingers/limbs	<ul style="list-style-type: none">• Don all necessary PPE; use a spotter to help back up to equipment. Lock out the controls before attempting to attach cables to equipment.	Bull Dozer Operator and laborer
5	Operating equipment after making sure area is cleared of all unnecessary personnel; pulling out stuck equipment	Cable or shackle breaks (becomes a flying projectile); dozer becomes stuck	<ul style="list-style-type: none">• Don all necessary PPE; after hooking up cables, let all personnel retreat to a safe area. Inspect cables and shackles before hooking up each time. Use qualified operator.	Bull Dozer Operator and laborer
6	Shut down and exiting of equipment	Slips, trips, falls; situational risks - use STAR	<ul style="list-style-type: none">• Keep the blade on the ground when the machine is not running; maintain three points of contact when entering or exiting.	Bull Dozer Operator

¹ Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: JSA Chainsaw Operations- Bucking Felled Timber



Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	August 8, 2007	JSA Type	Construction – Clearing
Work Type	Environmental Construction	Client	HIMCO Site Trust
Work Activity	Bucking of felled timber		
Work Site	Elkhart, Indiana		
Key Equipment	Chainsaw; first aid kit; fire extinguisher; emergency air horn		
Task-specific Training	General chain saw use		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input checked="" type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input checked="" type="checkbox"/> OTHER* <u>Chainsaw kickback</u>
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input checked="" type="checkbox"/> OTHER* <u>Properly fitted clothing</u>
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Protective hard toe logging boots, Gloves – Leather, face protection.			

Development Team	Position/Title	Reviewed By	Position/Title	Date
1. Jeffrey Maranciak	RHSM			
2. Don Osterhout	PM			
3. Steve Corning	Site Supervisor			



Job Safety Analysis (JSA)

JSA Filename: JSA Chainsaw Operations- Bucking Felled Timber



Safety Means Awareness.
Responsibility. Teamwork.

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Perform STAR Process - Refer to the chainsaw manufacturer's operators manual before operating any chainsaw. Check for branches under tension.	Slips, trips, falls; situational risks - use STAR	<ul style="list-style-type: none">• Verify personnel training is sufficient for scheduled task(s). Is Job Instruction Training (hands-on) training necessary? Review JSA Chainsaw Operations- General prior to beginning operations.	All Personnel
2	Inspect and use equipment and PPE	Equipment failure; PPE failure	<ul style="list-style-type: none">• Don all necessary PPE; training on inspection procedures.	All Personnel
3a	Setting up for bucking operations - clear the work area around the tree of brush and other obstructions. Ensure safe work distances from other operations.	Cuts; poison plants; biting/stinging insects; poisonous snakes; slippery conditions	<ul style="list-style-type: none">• Inspect the area for hazards. Train personnel on hazard recognition which includes identifying animals, plants, and hazardous situations. Observe and allow for hazards in surrounding trees which may be triggered by felling/limbing/bucking tree. Bucking should be done in a clear area to avoid saw tip contact with other logs which could result in kickback.	Chainsaw Operator and Site Supervisor
3b	Continue area setup - inspect each tree noting any hazards. Plan cuts before starting the saw.	Cuts; poison plants; biting/stinging insects; poisonous snakes; limbs under tension/stress (whipping hazard)	<ul style="list-style-type: none">• Inspect the area for hazards. Train personnel on hazard recognition which includes identifying animals, plants, and hazardous situations. Observe and allow for hazards in surrounding trees which may be triggered by felling/limbing/bucking tree. If tree is in a dangerous position have a piece of heavy equipment move tree into a safe position.	Chainsaw Operator
3c	Take position adjacent to tree. Stand with legs apart, braced, and with secure footing.	Biting insects; slips/trips/falls;	<ul style="list-style-type: none">• Make sure footing is sound. Do not get off balance. Stand with feet clear of tree and/or falling chunks. Do not stand directly behind saw while bucking to avoid injury in event of kickback. On steep slopes, work on the uphill side of the tree.	Chainsaw Operator



Job Safety Analysis (JSA)

JSA Filename: JSA Chainsaw Operations- Bucking Felled Timber



JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
4	Begin bucking tree by making the proper, pre-planned cuts - Refer to JSA Chainsaw Operations-General. If using a bar chainsaw begin undercut first.	General chainsaw hazards; tree failure; tree felling in wrong direction; slippery conditions; kickback hazards	<ul style="list-style-type: none">Review JSA Chainsaw Operation - General. To reduce kickback danger do not allow the tip of the saw to come in contact with other logs, ground, etc. Maintain a safe distance from other felling, skidding, and chainsaw operations. Keep the chain out of contact with rocks, gravel, and the ground. Never leave a log partially cut. Supervisor and/or peers should utilize behavioral observations.	Chainsaw Operator
5	Changing position between cuts - Refer to JSA Chainsaw Operations- General.	Slips, trips, falls; situational risks - use STAR; cuts/lacerations; poison plants; poison snakes; stinging insects	<ul style="list-style-type: none">Make sure the chain is not turning and keep finger off of throttle when walking between cuts. Maintain a safe distance between limbing operations and other logging operations. Maintain situational awareness.	Chainsaw Operator

¹ Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".





Job Safety Analysis (JSA)

JSA Filename: JSA Chainsaw Operations- Felling Timber



Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	August 8, 2007	JSA Type	Construction
Work Type	Environmental Construction	Client	HIMCO Site Trust
Work Activity	Manual felling of timber by a qualified, experienced chainsaw operator		
Work Site	Elkhart, Indiana		
Key Equipment	Chainsaw; first aid kit; fire extinguisher		
Task-specific Training	Chainsaw operation		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input checked="" type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER* <u>Chainsaw chaps</u>
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input checked="" type="checkbox"/> OTHER* <u>Properly fitted clothing</u>
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Protective hard toe type logging boots, Gloves – Leather, Face protection.			

Development Team	Position/Title	Reviewed By	Position/Title	Date
1. Jeffrey Maranciak	RHSM			
2. Don Osterhout	PM			
3. Steve Corning	Site Supervisor			



Job Safety Analysis (JSA)

JSA Filename: JSA Chainsaw Operations- Felling Timber



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Perform STAR Process - Refer to the chainsaw manufacturer's operators manual before operating any chainsaw. Check wind speed and direction.	Slips, trips, falls; situational risks - use STAR	<ul style="list-style-type: none">• Verify personnel training is sufficient for scheduled task(s). Is Job Instruction Training (hands-on) training necessary? Review JSA Chainsaw Operations- General prior to beginning operations.	All Personnel
2	Inspect and use equipment and PPE	Equipment failure; PPE failure	<ul style="list-style-type: none">• Don all necessary PPE; training on inspection procedures.	All Personnel
3a	Setting up for felling operations - clear the area around the tree of brush and other obstructions.	Cuts; poison plants; biting/stinging insects; poisonous snakes; wind; slippery conditions	<ul style="list-style-type: none">• Inspect the area for hazards. Train personnel on hazard recognition which includes identifying animals, plants, and hazardous situations.	Chainsaw Operator
3b	Continue area setup - inspect each tree noting lean; limbs; shape; crook; wind direction; butt defects; and dead, lodged limbs.	Cuts; poison plants; biting/stinging insects; poisonous snakes	<ul style="list-style-type: none">• Inspect the area for hazards. Train personnel on hazard recognition which includes identifying animals, plants, and hazardous situations. Observe and allow for hazards in surrounding trees which may be triggered by felling tree.	Chainsaw Operator
3c	Plan and clear an escape path at a 45-degree angle in the opposite direction to the planned direction of the tree being felled.	Biting insects; slips/trips/falls;	<ul style="list-style-type: none">• Inspect area for hazards. Do not let other personnel approach within two tree lengths of the trees being felled. Do not allow any personnel approach while chainsaw is running.	Chainsaw Operator and Site Supervisor
4	Move into position and make the proper cuts (undercut, felling cut, back cut) - Refer to JSA Chainsaw Operations- General. Domino falling of trees is not permitted.	General chainsaw hazards; tree failure; tree felling in wrong direction; windy conditions; slippery conditions	<ul style="list-style-type: none">• Review JSA Chainsaw Operation - General. Never cut a standing tree completely through in one continuous cut. Leave a sufficient hinge of wood between the undercut and the felling cut. Use wedges when necessary to aid the direction of fall. Back cuts shall be above the horizontal cut of the undercut. Always keep to the side of the tree being felled.	Chainsaw Operator



Job Safety Analysis (JSA)

JSA Filename: JSA Chainsaw Operations- Felling Timber



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
5	Move out of way of falling tree.	General chainsaw hazards; tree failure; tree felling in wrong direction; windy conditions; slippery conditions	<ul style="list-style-type: none">• Always keep to the side of tree being felled. When the tree starts to fall, stop the engine or engage the chainbrake, withdraw the bar, and walk away on the pre-planned escape path. NEVER TURN YOUR BACK ON THE FALLING TREE and beware of falling limbs.	Chainsaw Operator
6	Inspect area for potential hazards (whip hazards, lodged trees, biting/stinging insects nests, etc.).	Cuts; sprains/strains; slips/trips/falls; hazards from other equipment; biting insects	<ul style="list-style-type: none">• Never leave a lodged tree (a danger tree) because it may fall unexpectedly. Each danger tree should be felled using mechanical means. Never work in the area of a lodged tree.	Chainsaw Operator and Site Supervisor

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² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: JSA Chainsaw Operations- General



Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	August 8, 2007	JSA Type	Construction
Work Type	Environmental Construction	Client	HIMCO Site Trust
Work Activity	Transporting the chainsaw; starting the chainsaw; general/basic use procedures; and refueling		
Work Site	Elkhart, Indiana		
Key Equipment	Chainsaw; first aid kit; fire extinguisher; fuel/oil mixture and safety can(s)		
Task-specific Training	Chainsaw operation, fueling equipment		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)

<input type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input checked="" type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input checked="" type="checkbox"/> OTHER* <u>Chainsaw Chaps</u>
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input checked="" type="checkbox"/> OTHER* <u>Properly Fitted Clothing</u>

ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below

Gloves – Leather, Face Protection, Protective Hard-toed logging boots.

Development Team	Position/Title	Reviewed By	Position/Title	Date
1. Jeffrey Maranciak	RHSM			
2. Don Osterhout	PM			
3. Steve Corning	Site Supervisor			



Job Safety Analysis (JSA)

JSA Filename: JSA Chainsaw Operations- General



Safety Means Awareness:
Responsibility. Teamwork.

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Perform STAR Process - Refer to the chainsaw manufacturer's operators manual before operating any chainsaw.	Slips, trips, falls; situational risks - use STAR; short service employees	<ul style="list-style-type: none"> Verify personnel training is sufficient for scheduled task(s). Is Job Instruction Training (hands-on) training necessary? 	All Personnel
2	Inspect equipment and PPE	Equipment failure; PPE failure	<ul style="list-style-type: none"> Don all necessary PPE; training on inspection procedures. 	All Personnel
3a	Transport the chainsaw - By hand.	Cuts; burns; fire hazard	<ul style="list-style-type: none"> Stop the chainsaw engine. Grip the saw handle and place muffler at the side away from the body and guide bar to the rear. 	Chainsaw Operator
3b	Transport the chainsaw - by vehicle	Cuts; burns; fire hazard; fuel/oil spillage	<ul style="list-style-type: none"> Keep the chain and bar covered with chain guard. Properly secure the saw to prevent turnover, fuel/oil spillage, and damage to saw. 	Chainsaw Operator
4a	Starting the chainsaw (Review Manufacturer's instructions) - always make sure the chainbrake is engaged. DO NOT DROP START CHAINSAW	Cuts; burns; fuel/oil spillage	<ul style="list-style-type: none"> Do not remove or disable chainsaw kickback devices (I.e., chainbrake). Maintain handles, chainbrakes, chain, and covers. Position chainsaw as per manufacturer's instructions for starting. 	Chainsaw Operator
4b	Always start the saw on the ground; place one foot through handle, hold the top handle firmly, and make a firm even pull on the starter rope.	Cuts; burns; fuel/oil spillage; sprains/strains	<ul style="list-style-type: none"> Make sure handles are clean of oil/debris. DO NOT DROP START A SAW OR START SAW ON YOUR KNEE. Adjust the idle speed so the chain is not moving when the engine is idling. 	Chainsaw Operator
5	Moving into position	Cuts; sprains/strains; slips/trips/falls; hazards from other equipment	<ul style="list-style-type: none"> When moving from startup area, tree to tree, or when moving to another work area where hazardous conditions may exist - stop the chainsaw or engage the chainbrake. Inspect work area for slip/trip/fall hazards and hazards posed by other equipment. Employee hazard recognition training by supervisor. Proper work zone setup (laydown area, landing area, etc. 	Chainsaw Operator and Site Supervisor



Job Safety Analysis (JSA)

JSA Filename: JSA Chainsaw Operations- General



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
6	Use chainsaw to cut logs, trees, limbs, etc. - Reference relevant JSA for type of cutting such as JSA - Felling, JSA - Limbing; and/or JSA - Bucking.	Cuts; kickback - severe injuries to the legs, hands, face, and arms; falling limbs; flying wood debris; hazards from adjacent work activities	<ul style="list-style-type: none">• Use proper PPE. Maintain firm grip with both hands on saw for control. Position the thumb and fingers around the top handle for best control. Never use the saw above shoulder height and never reach - the chainsaw shall not be used to cut directly overhead. Keep the bar nose clear of other objects to prevent kickback. Avoid cutting with the upper part of the bar or use extreme caution when this technique cannot be avoided. Verify operator training. Use of behavioral observations. Maintain 2 tree length distance between manual fellers and 300 feet distance from mechanized felling operations. Do not operate chainsaw when tired/fatigued.	Chainsaw Operator and Site Supervisor
7	Refuel the chainsaw - mix oil/fuel properly	Damage to equipment; cuts; fires; burns	<ul style="list-style-type: none">• If possible, allow saw to cool. Refuel in a clean area on bare soil. Fuel at least 10 feet from any source of ignition. Use approved fuel can. Wipe fuel/oil from the saw. Move at least 10 feet away from the fueling area before restarting. Position fire extinguisher and first aid kit within a reasonable distance of chainsaw operations.	Chainsaw Operator

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² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: JSA Chainsaw Operations- Limbing Timber



Safety Means Awareness
Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	August 8, 2007	JSA Type	Construction
Work Type	Environmental Construction	Client	HIMCO Site Trust
Work Activity	Limbing of felled timber		
Work Site	Elkhart, Indiana		
Key Equipment	Chainsaw; first aid kit; fire extinguisher		
Task-specific Training	Chainsaw operation		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input checked="" type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input checked="" type="checkbox"/> OTHER* <u>Chainsaw Chaps</u>
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input checked="" type="checkbox"/> OTHER* <u>Properly fitting Clothing</u>
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Protective hard toe type logging boots, Gloves – Leather, Face protection			

Development Team	Position/Title	Reviewed By	Position/Title	Date
1. Jeffrey Maranciak	RHSM			
2. Don Osterhout	PM			
3. Steve Corning	Site Supervisor			



Job Safety Analysis (JSA)

JSA Filename: JSA Chainsaw Operations- Limbing Timber



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Perform STAR Process - Refer to the chainsaw manufacturer's operators manual before operating any chainsaw. Check for branches under tension.	Slips, trips, falls; situational risks - use STAR	<ul style="list-style-type: none"> Verify personnel training is sufficient for scheduled task(s). Is Job Instruction Training (hands-on) training necessary? Review JSA Chainsaw Operations- General prior to beginning operations. 	All Personnel
2	Inspect and use equipment and PPE	Equipment failure; PPE failure	<ul style="list-style-type: none"> Don all necessary PPE; training on inspection procedures. 	All Personnel
3a	Setting up for limbing operations - clear the work area around the tree of brush and other obstructions. Ensure safe work distances from other operations.	Cuts; poison plants; biting/stinging insects; poisonous snakes; slippery conditions	<ul style="list-style-type: none"> Inspect the area for hazards. Train personnel on hazard recognition which includes identifying animals, plants, and hazardous situations. 	Chainsaw Operator
3b	3b. Continue area setup - inspect each tree noting any hazards.	Cuts; poison plants; biting/stinging insects; poisonous snakes; limbs under tension/stress (whipping hazard)	<ul style="list-style-type: none"> Inspect the area for hazards. Train personnel on hazard recognition which includes identifying animals, plants, and hazardous situations. Observe and allow for hazards in surrounding trees which may be triggered by felling/limbing tree. 	Chainsaw Operator
3c	Take position adjacent to tree.	Biting insects; slips/trips/falls;	<ul style="list-style-type: none"> Make sure footing is sound. Do not get off balance. Stand with feet clear of tree and/or falling chunks. 	Chainsaw Operator and Site Supervisor
4a	Begin limbing tree by making the proper cuts - Refer to JSA Chainsaw Operations- General.	General chainsaw hazards; tree failure; tree felling in wrong direction; slippery conditions; kickback hazards	<ul style="list-style-type: none"> Review JSA Chainsaw Operation - General. Start limbing from the butt end of the tree and work towards the top. On steep slopes always stand on the uphill side of the tree. Limb from the ground - Do not walk on the tree. To reduce kickback danger do not limb with the tip of the saw. Watch for the "spring or jump" of limbs in a bind. Maintain a safe distance from other felling, skidding, and chainsaw operations. 	Chainsaw Operator
4b	Cutting "spring poles"	Limbs under tension	<ul style="list-style-type: none"> Relieve pressure by making several shallow cuts to release tension before cutting completely through. 	Chainsaw Operator



Job Safety Analysis (JSA)

JSA Filename: JSA Chainsaw Operations- Limbing Timber



JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
4c	Cutting large limbs	Cuts; sprains/strains; slips/trips/falls; hazards from other equipment; biting insects; chain binding; saw kickback	<ul style="list-style-type: none">• Be alert to saw placement.	Chainsaw Operator and Site Supervisor
4d	Cutting freely hanging limbs	Cuts; sprains/strains; slips/trips/falls; hazards from other equipment; biting insects; chain binding; saw kickback	<ul style="list-style-type: none">• To prevent chain binding, do not underbuck freely hanging limbs.	Chainsaw Operator and Site Supervisor

¹ Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: Decontamination: Sampling Equipment and Personnel (Level D)



Safety Means Awareness
Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	January 24, 2008	JSA Type	Decontamination
Work Type	Environmental	Client	HIMCO Site Trust
Work Activity	Decontamination of sampling equipment and personnel		
Work Site	Elkhart, Indiana		
Key Equipment	Alconox/liquinox, brushes, decontamination area set up		
Task-specific Training	Decontamination/Site Control; Quality Control/Sampling Plan; HAZWOPER		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)

<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input checked="" type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input checked="" type="checkbox"/> FACE SHIELD*	<input checked="" type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input type="checkbox"/> HEARING PROTECTION*	<input checked="" type="checkbox"/> PPE CLOTHING*	<input checked="" type="checkbox"/> OTHER* _____
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input checked="" type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____

ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below

Nitrile gloves to be worn when decontaminating reusable equipment, work will initiate in Level D.

For other PPE levels, see Section 7, and Table 7.1 for maximum/minimum alternate levels of PPE due to sustained levels greater than 1ppm or odor detected in the breathing zone.

Development Team	Position/Title	Reviewed By	Position/Title	Date
Lindsay Johnson	Peer Reviewer	Greg Smiley	Safety Professional	January 25, 2008



Job Safety Analysis (JSA)

JSA Filename: Decontamination: Sampling Equipment and Personnel (Level D)



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Decontamination of sampling equipment to include pumps, bailers, tubing, etc.	Contaminant exposure Pinch points Slip/Trip/Hit/Fall Heavy lifting	<ul style="list-style-type: none">• Wear appropriate PPE during decon activities (nitrile gloves)• Avoid putting hands in or near pinch points• Maintain good housekeeping, be aware of surroundings• Use proper lifting techniques, buddy lift when appropriate	Sampling personnel
2	Decontamination of personnel	Contaminant exposure Slip/Trip/Hit/Fall	<ul style="list-style-type: none">• Dispose of used PPE in accordance with site requirements• Wash hands and face before eating, drinking, or using tobacco products• Take care when removing PPE (boots, gloves, etc.). Sit down to remove/change boots as necessary	Sampling personnel
3	Management of waste derived from decontamination activities	Contaminant exposure Heavy lifting	<ul style="list-style-type: none">• Containerize decon waste (water, used PPE, etc) as required• Use proper lifting techniques, use buddy lifting or mechanical means when necessary	Sampling personnel

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² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: Earthwork: Trenching and Trench Entry Procedures



Safety Means Awareness.
Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	January 24, 2008	JSA Type	Construction
Work Type	Test Pitting	Client	HIMCO Site Trust
Work Activity	Trench Excavation		
Work Site	Elkhart, Indiana		
Key Equipment	Excavator; trench box with tabulated data sheet; ladder; air monitoring equipment (PID and 4-gas); excavation safety checklist		
Task-specific Training	Excavation safety training; Excavation Competent Person (for supervisors); heavy equipment safety; trench box setup/entry/egress		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)

<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES* Leather Abrasion Resistant
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input type="checkbox"/> HEARING PROTECTION*	<input checked="" type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER*
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____

ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below

For other PPE levels, see Section 7, and Table 7.1 for maximum/minimum alternate levels of PPE due to sustained levels greater than 1ppm or odor detected in the breathing zone.

Development Team	Position/Title	Reviewed By	Position/Title	Date
Lindsay Johnson	Peer Reviewer	Greg Smiley	Safety Professional	January 25, 2008



Job Safety Analysis (JSA)

JSA Filename: Earthwork: Trenching and Trench Entry Procedures



Safety Means Awareness.
Responsibility. Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Verify Utility Clearance procedures completed (overhead and underground). Verify excavation trench layout	Underground utility strike; Overhead utilities	<ul style="list-style-type: none">• QSF 019 on file?; Utility Locate Ticket number on file within 10 days of excavation startup?• Mark work area and safe distances for overhead lines; use spotter as necessary.	Supervisor and PM
2	Setup necessary work area and traffic controls	Fall-in; caught-between and struck-by hazards	<ul style="list-style-type: none">• Demarcate site and work areas to ensure that personnel and truck/equipment traffic is maintained safely and smoothly.• Stockpile and laydown area are setup properly.	SS and Laborers
3	Hand digging and pot holing activities conducted (where/if necessary based on utility locates)	Underground utility strike	<ul style="list-style-type: none">• Use preventive techniques; maintain proper utility clearances with heavy equipment and use hand digging/pot holing when necessary.	SS, Laborers, and Operator
4	Heavy equipment operations to excavate and handle soils and spoils	Caught-between and struck-by hazards; Underground/overhead utilities	<ul style="list-style-type: none">• Stay out of swing radius; use spotters to verify clear route of travel and work area; maintain eye contact with operator and/or signal operator; keep soil 2' from edges.• Inspect heavy equipment – document inspection.• Ensure above utility clearances and safe work protocols are followed.	All Affected Personnel
5	Trenching activities	Soil cave-in; noise; struck-by/against; encountering slag	<ul style="list-style-type: none">• Keep proper distances from edge of excavation. Limit equipment operations in trench area. Keep work area free of trip hazards. Perform necessary soil classification.• Use hearing protection as necessary.• Contact health physics/radiation safety contractor if slag encountered.	Operator, Radiation Contractor, Laborers, SS

¹ Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: JSA Equipment Fueling



Safety Means Awareness.
Responsibility. Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	May 28, 2008	JSA Type	Construction
Work Type	Environmental Construction	Client	HIMCO Site Trust
Work Activity	Pumping fuel into equipment		
Work Site	Elkhart, Indiana		
Key Equipment	Pickup Truck w/ Fuel Tank		
Task-specific Training	Operation of fuel pump		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER*
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER*
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Class II reflective vests, leather or Nitrile gloves			

Development Team	Position/Title	Reviewed By	Position/Title	Date
1. Jeffrey Maranciak	RSHM			
2. Don Osterhout	PM			
3. Steve Corning	Site Supervisor			



Job Safety Analysis (JSA)

JSA Filename: JSA Equipment Fueling



Safety Means Awareness.
Responsibility. Teamwork.

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Perform STAR Process- Refer to the equipment manufacturer's operating manual before using any machinery	Slips, trips, falls; situational risks - use STAR; short service employees	<ul style="list-style-type: none">• Verify personnel training is sufficient for scheduled task(s). Is Job Instruction (hands-on) Training necessary?	All Personnel
2	Place Nozzle in tank	Property damage and personal injury from fire; fire potential from static/contact spark	<ul style="list-style-type: none">• No cell phones allowed on site. No cell phones in fueling areas. No smoking. No fueling during storm events. Meet with owner's representative to determine appropriate area for fueling. Have two 20lb fire extinguishers within 25 feet of the fueling area.	All Personnel
3	Turn on pump and dispense fuel into equipment	Property damage and personal injury from fire; fire potential from static/contact spark; personal injury due to skin /eye contact with fuel due to splash/ spills of fuel	<ul style="list-style-type: none">• No cell phones allowed on site. No cell phones in fueling areas. No smoking. No fueling during storm events. Meet with owner's representative to determine appropriate area for fueling. Have two 20lb fire extinguishers within 25 feet of the fueling area. Ensure the end of the nozzle is secured in the tank before turning on the pump and dispensing fuel. Wear the proper PPE. Stay upwind when fueling equipment. Remain in attendance of the nozzle at all times during fueling. Avoid overfilling of the equipment.	All Personnel
4	Turn off pump and return nozzle to the fuel tank	Property damage and personal injury from fire; fire potential from static/contact spark; slips/trips/ falls; pinch points	<ul style="list-style-type: none">• No cell phones allowed on site. No cell phones in fueling areas. No smoking. No fueling during storm events. Meet with owner's representative to determine appropriate area for fueling. Have two 20lb fire extinguishers within 25 feet of the fueling area. Ensure the end of the nozzle is secured in the tank before turning on the pump and dispensing fuel. Wear the proper PPE. Stay upwind when fueling equipment. Remain in attendance of the nozzle at all times during fueling. Avoid overfilling of the equipment. Pay Attention to surroundings. Pick up tools, equipment, and trash in the fueling area. Pay attention to the surroundings. Wear gloves. Do not rush.	All Personnel



Job Safety Analysis (JSA)

JSA Filename: JSA Equipment Fueling



Safety Means Awareness
Responsibility Teamwork

- ¹ Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
- ² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"
- ³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: Excavation Oversight/Confirmation Sample Collection



Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	January 24, 2008	JSA Type	Excavation Oversight
Work Type	Excavation	Client	HIMCO Site Trust
Work Activity	Excavation Oversight/Confirmation Sample Collection/Test Pitting		
Work Site	Elkhart, Indiana		
Key Equipment	Air monitoring equipment; safety cones/fencing/barricades.		
Task-specific Training	Excavation Safety; HAZWOPER, Air Monitoring		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)

<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES* Leather and Nitrile
<input checked="" type="checkbox"/> HARD HAT	<input checked="" type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input checked="" type="checkbox"/> PPE CLOTHING* Modified Level D (MLD)	<input checked="" type="checkbox"/> OTHER* Photoionization Detector
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____

ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below

Work may initiate in modified level D. High visibility Class II safety vest, nitrile gloves, Tyvek coveralls and PVC overboots as appropriate.

For other PPE levels, see Section 7, and Table 7.1 for maximum/minimum alternate levels of PPE due to sustained levels greater than 1ppm or odor detected in the breathing zone.

Development Team	Position/Title	Reviewed By	Position/Title	Date
Lindsay Johnson	Peer Reviewer	Greg Smiley	Safety Professional	January 25, 2008



Job Safety Analysis (JSA)

JSA Filename: Excavation Oversight/Confirmation Sample Collection



Safety Means Awareness.
Responsibility. Teamwork.

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	General Site Activities/Traverse site to set up & remove sampling supplies at pre-determined sampling location	Property damage and personal injury from contact with heavy equipment (i.e. excavator, trucks, etc.) Slip/Trip/Fall from uneven terrain, piping, weather conditions, and/or overloading/awkward load Injury from biological hazards Personal injury from poor ergonomics Heavy lifting Back injuries and muscle strains Personal injury from falling into excavation/ engulfment	Keep visual contact with the operator at all times when approaching equipment; have a clear view of your surroundings. Keep a clear view of other moving equipment on site to assure no unexpected movements. Restrict dump trucks to designated roads and/or paths Recognize and identify surface anomalies caused by traffic, existing structures (i.e. piping) and vegetation (STAR) Use mechanical assistance or take multiple trips to carry equipment Inspect travel path for weather-related hazards (i.e. puddles and/or mud) Use established path and/or access ways Lift with your legs when moving sampling supplies. Get assistance when carrying sampling equipment over uneven ground or if the equipment weighs > 50 lbs. Personnel should stay at least 2' from edge of excavation Install orange construction fencing around excavated area if left unattended If temporary security fencing is utilized, inspect it and remove hazards related to protruding wire ties, fencing, etc. No personnel should enter a trench >4' in depth Trenches >4' should have the walls sloped backwards; note the competency of the soil to assess degree of slope Provide OSHA acceptable exits into trenches and excavations at an interval <25' Keep all excavated material a minimum of 2' from the edge of the excavation	



Job Safety Analysis (JSA)

JSA Filename: Excavation Oversight/Confirmation Sample Collection



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
2	Collect soil sample from excavator bucket	Hearing loss from excessive noise Exposure to contaminants; soil, water, particulates and vapor Personal injury from broken glass container. Personal injury from contact with excavator bucket	Sound level exceeds 85db, put on hearing protection: Rule of Sound: If you are normal conversation distance and need to raise voice, put on hearing protection Monitor breathing zone with PID and upgrade PPE per HASP Wear nitrile gloves when handling impacted materials See General Site Activities D1 Utilize air purifying respirator and appropriate cartridges to minimize inhalation of particulates Inspect container/cooler for broken glass. Inspect glassware prior to filling for cracks. Dispose of broken glassware in appropriate waste receptacle Make sure bucket is lowered to ground surface prior to approaching. Do not approach bucket until the operator indicates it is safe. Do not turn your back to the bucket until >10' out of swing radius of equipment. Communicate to operator when safe to lift the bucket and proceed with work activities.	
3	Decontaminate Sampling Equipment	Exposure to contaminants; soil, water, particulates and vapor Personal injury from contact with sharp tools	Wear nitrile gloves when handling impacted materials See General Site Activities Step 1. Utilize air purifying respirator and appropriate cartridges to minimize inhalation of particulates Dispose of affected materials in designated containers that are labeled with type of waste Don leather gloves to prevent cuts from sharp or rough edges. Place sampling tools with sharp or pointed edge down in decontamination container.	

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² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: JSA Grapple Bucket Operations



Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	May 7, 2008	JSA Type	Construction
Work Type	Environmental Construction	Client	HIMCO Site Trust
Work Activity	Tree moving/basic use procedures, and refueling equipment		
Work Site	Elkhart, Indiana		
Key Equipment	Skid Steer- Grapple Bucket Attachment		
Task-specific Training	Heavy equipment operation, grapple use, fueling equipment		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER* _____
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Class II reflective safety vest, leather or Nitrile gloves			

Development Team	Position/Title	Reviewed By	Position/Title	Date
Jeff Maranciak	RHSM			
Don Osterhout	PM			



Job Safety Analysis (JSA)

JSA Filename: JSA Grapple Bucket Operations



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Perform STAR Process- Refer to the equipment manufacturer's operating manual before using any machinery	Slips, trips, falls; situational risks - use STAR; short service employees	<ul style="list-style-type: none"> Verify personnel training is sufficient for scheduled task(s). Is Job Instruction (hands-on) Training necessary? 	All Personnel
2	Daily inspection report while inspecting machine	Equipment problems; PPE failure	<ul style="list-style-type: none"> Don all necessary PPE; trained on inspection procedures. 	Skid Steer Operator
3	Transporting the equipment to the work area	Backing into or running over objects	<ul style="list-style-type: none"> Walk around the equipment or use a spotter when necessary. 	Skid Steer Operator
4	Hooking up to the necessary attachment	Cuts; pinched fingers/limbs	<ul style="list-style-type: none"> Don all necessary PPE; use a spotter to help hook up the attachment. Shut down equipment when hooking up hydraulic hoses. 	Skid Steer Operator and laborer
5	Operating equipment after making sure area is cleared of all unnecessary personnel	Moving trees can roll or fall when turning; brush and limbs braking or flying off; visibility when backing up	<ul style="list-style-type: none"> Don all necessary PPE; keep attachments as close to the ground as possible; shut down operation and use a spotter when needed. Keep a clear corridor where only this equipment is allowed. Personnel should maintain 300' from grapppler operations. 	Skid Steer Operator and laborer
6	Shut down and exiting of equipment	Slips, trips, falls; situational risks - use STAR	<ul style="list-style-type: none"> Keep all attachments on the ground when the machine is not running; maintain three points of contact when entering or exiting. 	Skid Steer Operator

¹ Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: Groundwater Sampling Activities



Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather (environmental) conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	January 24, 2008	JSA Type	Groundwater Sampling
Work Type	Environmental	Client	HIMCO Site Trust
Work Activity	Groundwater sampling		
Work Site	Elkhart, Indiana		
Key Equipment	Bladder pump or submersible; photoionization detector; safety cones/barricades.		
Task-specific Training	Electrical safety (if using pump), groundwater sampling procedures, HAZWOPER – Reference HASP for additional Site/Client safety training requirements.		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)

<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input checked="" type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER* _____
<input checked="" type="checkbox"/> SAFETY GLASSES WITH SIDESHIELDS	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____

ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below

Use nitrile gloves when handling wet sampling containers. Use abrasion/cut-resistant gloves for other tasks. Work will initiate in Level D. High visibility Class II safety vest, nitrile gloves, Tyvek coveralls and PVC overboots as appropriate based on observed areas of calcium sulfate disturbance or other field conditions.

For other PPE levels, see Section 7, and Table 7.1 for maximum/minimum alternate levels of PPE due to sustained levels greater than 1ppm or odor detected in the breathing zone.

Development Team	Position/Title	Reviewed By	Position/Title	Date
Lindsay Johnson	Peer Reviewer	Greg Smiley	Safety Professional	January 25, 2008



Job Safety Analysis (JSA)

JSA Filename: Groundwater Sampling Activities



Safety Means Awareness.
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Inspect/calibrate sampling equipment	Loss due to malfunctioning equipment	<ul style="list-style-type: none">Check all equipment to ensure it is in proper working order and has been calibrated to CRA and manufacturer's standards. Document.	Sampling Technician
2	Establish work zone at monitoring well location	Traffic Pinch points Back strain	<ul style="list-style-type: none">Maintain awareness of on-site traffic patterns and walking paths; setup barricades – Use work gloves when setting up barricades and be aware of hand placement.Use buddy system and proper lifting techniques.	Sampling Technician
3	Open monitoring well cover(s)	Pinch points Hand injury Biological hazards	<ul style="list-style-type: none">Avoid placing hands in pinch points.Wear proper PPE (gloves) for task and use the proper tool(s) when opening well covers (open face wrench/socket wrench). Inspect for other hazards that may affect the hands (hypodermic needles, etc.).Heightened awareness of wasps, ants, bees, spiders, and poison plants.	Sampling Technician
4	Measure water levels	Contaminant exposure Cross contamination	<ul style="list-style-type: none">Wear proper PPE (nitrile gloves); use PID to monitor air quality.Decon probe and measuring tape following gauging of well.	Sampling Technician
5	Develop/purge monitoring well location (select one or both – peristaltic pump or bailer – hazards will be contingent upon method)	Slips/trips/falls Cuts Pinch points Electrical (AC or DC) Back and shoulder strain	<ul style="list-style-type: none">Maintain housekeeping; be aware of ground conditions.Use PPE and proper tools.Keep hands away from pinch points.Inspect wiring, clamps, cables, etc.; avoid arcing.Stretch affected muscles (triceps, back, neck, and shoulder) prior to/during/after activity; avoid repetitive motions and overhead lifts; use proper lifting techniques and neutral postures; take breaks.	Sampling Technician
6	Collect groundwater sample utilizing pump	Chemical exposure Cuts from container breaking Sample misidentification	<ul style="list-style-type: none">Wear proper PPE.Inspect bottles for signs of breakage/damage; do not use suspect containers; Close glass bottles carefully – avoid cross threading lid and bottle.Ensure sample id numbers match sample location/site plan; Check sample labels for accuracy prior to placing in container.	Sampling Technician



Job Safety Analysis (JSA)

JSA Filename: Groundwater Sampling Activities



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
7	Close monitoring well cover	Traffic Hand injury Pinch points	<ul style="list-style-type: none">• Maintain awareness of on-site traffic patterns; verify barricades are still in place.• Wear appropriate gloves and use proper tool(s).• Avoid placing hands in pinch points.	Sampling Technician
8	Pack samples in container (i.e., cooler)	Bottle breakage Chemical exposure Back strain Lost time due to sampling error	<ul style="list-style-type: none">• Pack glass containers in bubble wrap or equivalent protection.• Wear appropriate PPE (nitrile gloves).• Use proper lifting techniques and buddy lifts (if necessary).• Ensure samples are packed/labeled/shipped correctly – double-check.	Sampling Technician
9	Manage any investigative derived waste (IDW)	Chemical exposure Pinch points Slips/trips/falls Heavy lifting Mislabeling waste	<ul style="list-style-type: none">• Wear appropriate PPE (nitrile gloves) and work gloves.• Avoid pinch points; use proper PPE.• Inspect for proper housekeeping; clean up work area.• Use proper lifting techniques; stretch affected muscles; do not lift more than 50 pounds unassisted – use lifting devices and a buddy to assist.• Label IDW appropriately (generator, contact number, identification of contents, and site location); specify type of contents; arrange for disposal.	Sampling Technician and Project Manager

¹ Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: JSA Mobile Equipment Operations- General



Safety Means Awareness
Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	May 7, 2008	JSA Type	Construction
Work Type	Environmental Construction	Client	HIMCO Site Trust
Work Activity	Moving and operating mobile/heavy equipment		
Work Site	Elkhart, Indiana		
Key Equipment	Bulldozer; Skid Steer – with hydro-axe, grapple and grinder attachments		
Task-specific Training	Heavy equipment operation, fueling equipment, daily inspection of equipment		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input checked="" type="checkbox"/> OTHER* <u>Properly Fitted Clothing</u>
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER*
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Protective hard toe type logging boots, Gloves - Leather			

Development Team	Position/Title	Reviewed By	Position/Title	Date
1. Jeffrey Maranciak	RHSM			
2. Don Osterhout	PM			
3. Steve Corning	Site Supervisor			



Job Safety Analysis (JSA)

JSA Filename: JSA Mobile Equipment Operations- General



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Perform STAR Process - Refer to the mobile/heavy equipment manufacturer's operators manual before operating equipment. Woods equipment will be equipped as necessary to protect the operator (ROPS, FOPS, mesh enclosures, etc.).	Slips, trips, falls; situational risks - use STAR; short service employees	<ul style="list-style-type: none">• Verify personnel training is sufficient for scheduled task(s). Is Job Instruction Training (hands-on) training necessary? Employees should remove finger rings, necklaces, or jewelry which may be hazardous in equipment operation.	All Personnel
2a	Perform daily (pre-shift) equipment inspection include area around the equipment and PPE. Perform a complete walk around inspection	Equipment failure; PPE failure	<ul style="list-style-type: none">• Don all necessary PPE; training on inspection procedures. Document daily inspection. Defects must be corrected before operating unit.	Operator
2b	Mount/dismount the equipment NOTE: The most common cause of injury for equipment operators is slipping/falling while mounting/dismounting the machine. NEVER JUMP FROM THE MACHINE.	Slips, trips, falls; sprains; strains	<ul style="list-style-type: none">• Use 3 points of contact; clean tracks and personnel access points of debris and mud as necessary. Only a trained operator will be allowed on equipment. Never carry riders unless unit is so designed.	Operator
3a	Starting heavy/mobile equipment NOTE: All operators manuals should be available for each piece of equipment and used in employee training.	Struck-by; caught between; equipment failure	<ul style="list-style-type: none">• Perform inspection (see item 2a.) Check to be certain all workers and equipment are safe distance from unit. Allow proper warm-up and wait for gauges to register properly. Raise the blade; cable and chokers; boom; grapple; or other attachments before moving the unit.	Operator
3b	Operation of heavy/mobile equipment	Struck-by; caught between; overhead/underground utilities; flying debris; rollover; fire; improper housekeeping; winch failure	<ul style="list-style-type: none">• Appropriate guarding (according to machine type and use) will be in place at all times unit is in operation. Backup alarms will be functional. Seat belts will be provided and their use enforced. Fire extinguishers and first aid kits will be provided on each unit. Fire extinguishers will be inspected for functionality on a daily basis. Do not overload winch.	Operator



Job Safety Analysis (JSA)

JSA Filename: JSA Mobile Equipment Operations- General



Safety Means Awareness.
Responsibility Teamwork.

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
4a	Perform equipment maintenance	Equipment failure/loss; sharp objects; pinch points	<ul style="list-style-type: none">• Use STAR process. Follow equipment manufacturer's preventive maintenance procedures and instructions. Only qualified individuals should perform maintenance activities on equipment.	Operator and Site Supervisor
4b	Cleaning and housekeeping of equipment	Fires; slips, trips, falls; equipment failure	<ul style="list-style-type: none">• Remove loose items from operator's compartment. At least once per day remove trash from equipment. Clean equipment as necessary to prevent buildup of debris, wood chips, etc. that may cause fire.	Operator and Site Supervisor

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² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: JSA Shear Operations



Safety Means Awareness
Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	May 7, 2008	JSA Type	Construction
Work Type	Environmental Construction	Client	HIMCO Site Trust
Work Activity	Cutting and moving trees/basic use procedures, and refueling equipment		
Work Site	Elkhart, Indiana		
Key Equipment	Skid Steer Shear Attachment		
Task-specific Training	Heavy equipment operation, shear attachment use, fueling equipment		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER*
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER*
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Class II reflective safety vest; leather or Kevlar gloves			

Development Team	Position/Title	Reviewed By	Position/Title	Date
1. Jeffrey Maranciak	RHSM			
2. Don Osterhout	PM			
3. Steve Corning	Site Supervisor			



Job Safety Analysis (JSA)

JSA Filename: JSA Shear Operations



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Perform STAR Process- Refer to the equipment manufacturer's operating manual before using any machinery	Slips, trips, falls; situational risks - use STAR; short service employees	<ul style="list-style-type: none"> • Verify personnel training is sufficient for scheduled task(s). Is Job Instruction (hands-on) Training necessary? 	All Personnel
2	Daily inspection report while inspecting machine	Equipment problems; PPE failure	<ul style="list-style-type: none"> • Don all necessary PPE; trained on inspection procedures. 	Skid Steer Operator
3	Transporting the equipment to the work area	Backing into or running over objects	<ul style="list-style-type: none"> • Walk around the equipment or use a spotter when necessary. 	Skid Steer Operator
4	Hooking up to the necessary attachment	Cuts; pinched fingers/limbs	<ul style="list-style-type: none"> • Don all necessary PPE; use a spotter to help hook up the attachments. Shut down equipment when hooking up hydraulic hoses. 	Skid Steer Operator and laborer
5	Operating equipment after making sure area is cleared of all unnecessary personnel	Flying debris from falling trees; running over stumps; kickback of sheared trees	<ul style="list-style-type: none"> • Don all necessary PPE; keep attachments as close to the ground as possible; use a spotter when needed. Check lean of the tree, area proposed tree should be laid down, wind direction and speed. Keep ground personnel 300' or more from shear operations. 	Skid Steer Operator and laborer
6	Shut down and exiting of equipment.	Slips, trips, falls; situational risks - use STAR	<ul style="list-style-type: none"> • Keep all attachments on the ground when the machine is not running; maintain three points of contact when entering or exiting. 	Skid Steer Operator

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² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: JSA Skid Steer Operations



Safety Means Awareness
Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	May 7, 2008	JSA Type	Construction
Work Type	Environmental Construction	Client	HIMCO Site Trust
Work Activity	Clearing and moving trees/basic use procedures, and refueling equipment		
Work Site	Elkhart, Indiana		
Key Equipment	Skid Steer; first aid kit; fire extinguisher		
Task-specific Training	Heavy equipment operation, fuelinequipment		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER* _____
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Class II reflective safety vest, leather or Nitrile gloves			

Development Team	Position/Title	Reviewed By	Position/Title	Date
1. Jeff Maranciak	RHSM			
2. Don Osterhout	PM			
3. Steve Corning	Site Supervisor			



Job Safety Analysis (JSA)

JSA Filename: JSA Skid Steer Operations



Safety Means Awareness.
Responsibility. Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Perform STAR Process- Refer to the equipment manufacturer's operating manual before using any machinery	Slips, trips, falls; situational risks - use STAR; short service employees	<ul style="list-style-type: none">• Verify personnel training is sufficient for scheduled task(s). Is Job Instruction (hands-on) Training necessary?	All Personnel
2	Daily inspection report while inspecting machine	Equipment problems; PPE failure	<ul style="list-style-type: none">• Don all necessary PPE; trained on inspection procedures.	Skid Steer Operator
3	Transporting the equipment to the work area	Backing into or running over objects	<ul style="list-style-type: none">• Walk around the equipment or use a spotter when necessary.	Skid Steer Operator
4	Hooking up to the necessary attachment(s)	Cuts; pinched fingers/limbs	<ul style="list-style-type: none">• Don all necessary PPE; use a spotter to help hook up the attachment(s). Shut down equipment when hooking up hydraulic hoses.	Skid Steer Operator and laborer
5	Operating equipment after making sure area is cleared of all unnecessary personnel	Flying debris from cutting; running over stumps/wire/other unknowns	<ul style="list-style-type: none">• Don all necessary PPE; keep attachments as close to the ground as possible; use a spotter when needed. Keep ground personnel 300' or more from any chipping/shearing operations.	Skid Steer Operator and laborer
6	Shut down and exiting of equipment	Slips, trips, falls; situational risks - use STAR	<ul style="list-style-type: none">• Keep all attachments on the ground when the machine is not running; maintain three points of contact when entering or exiting.	Skid Steer Operator

¹ Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)
JSA Filename: Soil Boring Installation (General Procedures)



Safety Means Awareness.
Responsibility. Teamwork.

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	January 24, 2008	JSA Type	Drilling Oversight
Work Type	Environmental	Client	HIMCO Site Trust
Work Activity	Soil Boring Installation		
Work Site	Elkhart, Indiana		
Key Equipment	Air monitoring equipment; safety cones/fencing/barricades.		
Task-specific Training	Drilling Safety, PPE, HAZWOPER, Air Monitoring.		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)

<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input checked="" type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input checked="" type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input checked="" type="checkbox"/> PPE CLOTHING*	<input checked="" type="checkbox"/> OTHER* _____
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____

ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below

Work will be initiated in modified level D. High visibility Class II safety vest, nitrile gloves, Tyvek coveralls and PVC overboots if needed.

For other PPE levels, see Section 7, and Table 7.1 for maximum/minimum alternate levels of PPE due to sustained levels greater than 1ppm or odor detected in the breathing zone.

Development Team	Position/Title	Reviewed By	Position/Title	Date
Lindsay Johnson	Peer Reviewer	Greg Smiley	Safety Professional	January 25, 2008



Job Safety Analysis (JSA)

JSA Filename: Soil Boring Installation (General Procedures)



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Markout of underground utilities.	Property damage; Explosion; Electrocuting; Injury; Death	<ul style="list-style-type: none">Call public underground utility agency (One-Call) at least 5 or more days prior to work activities; Review State Law pertaining to underground pipe line safety and have private utility mark-out performed.,Expose lines if warranted (ie hand dig, test pit or daylight)	Project Manager and Site Supervisor
2	Conduct site walk, identify unsafe conditions, and determine sample point locations	Traffic; Slips/trips/falls; Biological hazard; Overhead/underground hazards	<ul style="list-style-type: none">Maintain awareness of on-site traffic and walking surfaces.When selecting soil boring locations, be aware of biological hazards (e.g. ants, poison ivy, wasps) and overhead/underground hazards (e.g. overhead utilities, concrete scarring, station canopy).	Site Personnel
3	Inspection of equipment	Pinch points; Injury; Property damage; Lost time due to damaged equipment/parts	<ul style="list-style-type: none">Discuss pinch points on equipment (e.g. drill rig, air knife, pressure washer, etc.).Familiarize all personnel with location/operation of fire extinguisher(s) and kill switch on drill rig.Visually inspect equipment/parts for damage; document inspections.	Site Personnel
4	Set up work zone for drilling	Traffic; Slips/trips/falls; Property damage; Overhead hazards; Environmental impact	<ul style="list-style-type: none">Maintain awareness of on-site traffic, work zones, walking surfaces, overhead hazards (e.g. canopy and low hanging overhead lines). Utilize barricades/cones/caution tape to define work zone and direct traffic.Wear leather/cotton when setting up barricades.Be aware of any potential sensitive receptors and verify all personnel are aware of the location of spill kit.	Site Personnel
5	Set up staging area	Traffic; Slips/trips/falls; Back strain; Injury; Pinch points; Heat/Cold stress	<ul style="list-style-type: none">Maintain awareness of on-site traffic and walking surfaces. Utilize barricades/cones/caution tape to define work zone and direct traffic.Wear leather/cotton gloves when setting up barricades.Utilize proper lifting techniques and use buddy system if needed.Avoid placing hands/fingers in pinch point locations.In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g. canopy, fan, glove warmers).	Site Personnel



Job Safety Analysis (JSA)

JSA Filename: Soil Boring Installation (General Procedures)



JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
6	Contractor oversight/ management of hole clearance/drilling activities	Traffic; Slips/trips/falls; Back strain; Injury; Underground utilities; Contaminant exposure; Heat/Cold stress	<ul style="list-style-type: none">• Maintain awareness of on-site traffic and practice good house keeping.• Ensure subcontractors don proper PPE (e.g. safety glasses, leather/cotton gloves, hearing protection) and utilize proper lifting techniques.• If non-native material (e.g. pea gravel, sand, fill material) or underground utilities are observed, utilize SWA and assess situation.• Monitor safe drill movement / Positional set-up• Monitor breathing zone and refer to HASP for action levels.• Monitor all personnel for signs and symptoms of heat/cold stress and refer to HASP for recommendations.• Be aware of unsafe hoisting and material handling practices.• Be aware of proper augering and auger handling techniques..	Site Personnel
7	Site / Boring security	Traffic; Injury; Slips/trips/falls; Back strain	<ul style="list-style-type: none">• Wear leather/cotton gloves when moving barricades.• Maintain awareness of on-site traffic and walking surfaces.• Use proper lifting techniques and buddy system if needed. Ensure area is clean of debris.• Secure boring location if open overnight.	Site Personnel

¹ Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: Soil Gas Sampling (General Procedures)



Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	January 24, 2008	JSA Type	Soil Gas Sampling
Work Type	Environmental	Client	HIMCO Site Trust
Work Activity	Soil Gas Sampling (General Procedures) – Follow Quality Assurance Plan and/or Work Plan		
Work Site	Elkhart, Indiana		
Key Equipment	Air monitoring equipment, tubing, pump		
Task-specific Training	HAZWOPER, CRA Field Method Training on soil sampling procedures		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)

<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input checked="" type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input checked="" type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input type="checkbox"/> HEARING PROTECTION*	<input checked="" type="checkbox"/> PPE CLOTHING*	<input checked="" type="checkbox"/> OTHER* _____
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input checked="" type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____

ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below

Work will be initiated in Modified level D. Leather gloves to be worn when using shears to cut tubing. Nitrile gloves to be worn during all other components of soil gas sampling activities. High visibility Class II safety vest, Tyvek coveralls and PVC overboots to be worn as appropriate.

For other PPE levels, see Section 7, and Table 7.1 for maximum/minimum alternate levels of PPE due to sustained levels greater than 1ppm or odor detected in the breathing zone.

Development Team	Position/Title	Reviewed By	Position/Title	Date
Lindsay Johnson	Peer Reviewer	Greg Smiley	Safety Professional	January 25, 2008



Job Safety Analysis (JSA)

JSA Filename: Soil Gas Sampling (General Procedures)



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Inspect and calibrate sampling and monitoring equipment	Lost time from improperly functioning equipment; Incorrect sampling procedures/collection due to malfunctioning equipment	<ul style="list-style-type: none">• Ensure all equipment is functioning properly; complete Quality Control documents.	Sampling Technician
2	Prepare to collect soil samples	Back strain; Pinch points; Cuts; Punctures; Sample misidentification	<ul style="list-style-type: none">• Use proper lifting techniques and buddy system if needed.• Avoid placing hands/fingers in pinch point locations.• Use proper tools when opening container packaging. Do not use fixed open blade knives when opening boxes or containers.• Ensure the sample id label matches sample location with site plan/CRA Site Supervisor/subcontractor.	Sampling Technician
3	Cutting tubing (if applicable)	Cuts due to sharp edges of shears	<ul style="list-style-type: none">• Be careful and aware when using shears to cut tubing. Wear leather gloves.	Sampling Technician
4	Sample collection	Contaminant exposure; Sample misidentification	<ul style="list-style-type: none">• Do not inhale exhaust from soil gas sampling pump during sample collection.• Wear nitrile gloves and replace between soil gas samples.• Inspect sampling containers for breaks/cracks. Do not attempt to use any suspect containers.• Check sample labels for accuracy prior to placing in cooler.	Sampling Technician
5	Investigation derived waste (IDW) management	Contaminant exposure; Heavy lifting; Pinch points; Slips/trips/falls; Mislabelled waste	<ul style="list-style-type: none">• Wear nitrile gloves when handling IDW.• Use proper lifting techniques to transport/dispose of IDW into drums and use buddy system if needed.• Avoid placing hands/fingers in pinch point locations.• Maintain awareness of walking surfaces.• Label IDW with generator, a contact number, identification of contents, and site location. Specify IDW as either hazardous or non-hazardous material.	Sampling Technician

¹ Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.



Job Safety Analysis (JSA)

JSA Filename: Soil Gas Sampling (General Procedures)



Safety Means Awareness
Responsibility Teamwork

- ² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"
- ³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: Soil Sampling (General Procedures)



Safety Means Awareness
Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	January 24, 2008	JSA Type	Soil Sampling
Work Type	Environmental	Client	HIMCO Site Trust
Work Activity	Soil Sampling (General Procedures) – Follow Quality Assurance Project Plan and/or Field Sampling Plan		
Work Site	Elkhart, Indiana		
Key Equipment	Air monitoring equipment		
Task-specific Training	HAZWOPER, CRA Field Method Training on soil sampling procedures		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)

<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input checked="" type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input checked="" type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input type="checkbox"/> HEARING PROTECTION*	<input checked="" type="checkbox"/> PPE CLOTHING*	<input checked="" type="checkbox"/> OTHER* _____
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input checked="" type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____

ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below

Work will be initiated in Modified level D. Gloves will dependent on the task and chemical contamination present or suspected present. High visibility Class II safety vest, Tyvek coveralls and PVC overboots to be used as appropriate.

For other PPE levels, see Section 7, and Table 7.1 for maximum/minimum alternate levels of PPE due to sustained levels greater than 1ppm or odor detected in the breathing zone.

Development Team	Position/Title	Reviewed By	Position/Title	Date
Lindsay Johnson	Peer Reviewer	Greg Smiley	Safety Professional	January 25, 2008



Job Safety Analysis (JSA)

JSA Filename: Soil Sampling (General Procedures)



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Inspect and calibrate sampling and monitoring equipment	Lost time from improperly functioning equipment; Incorrect sampling procedures/collection due to malfunctioning equipment	<ul style="list-style-type: none">• Ensure all equipment is functioning properly; complete Quality Control documents.	Sampling Technician
2	Prepare to collect soil samples	Back strain; Pinch points; Cuts; Punctures; Sample misidentification	<ul style="list-style-type: none">• Use proper lifting techniques and buddy system if needed.• Avoid placing hands/fingers in pinch point locations.• Use proper tools when opening container packaging. Do not use fixed open blade knives when opening boxes or containers.• Ensure the sample id label matches sample location with site plan/CRA Site Supervisor/subcontractor.	Sampling Technician
3	Opening the sample sleeve (if applicable)	Cuts due to sharp edges of sample sleeve; Contaminant exposure	<ul style="list-style-type: none">• Use sleeve cutter for opening the sample sleeves. Keep hands clear of the sleeve when cutting. Wear nitrile gloves. Maintain awareness of sharp edges of sample sleeve.	Sampling Technician
4	Sample collection	Contaminant exposure; Cuts from container breakage; Sample misidentification	<ul style="list-style-type: none">• Wear nitrile gloves and replace between soil samples.• Inspect glass bottles for breaks/cracks. Do not attempt to use any suspect containers. Close glass sample containers carefully to avoid breakage.• Check sample labels for accuracy prior to placing in cooler.	Sampling Technician
5	Headspace screening of samples	Contaminant exposure; Incorrect headspace readings	<ul style="list-style-type: none">• Wear nitrile gloves.• Ensure proper calibration of equipment.	Sampling Technician
6	Sample selection	Bottle breakage; Contaminant exposure; Pinch points; Lost time due to incorrect sample selection	<ul style="list-style-type: none">• Wear nitrile gloves when handling sample containers.• Confirm selected samples are correct based on work plan selection criteria, PID readings, and soil boring logs.• Avoid placing hands/fingers in pinch point locations (e.g. between cooler and lid).	Sampling Technician



Job Safety Analysis (JSA)

JSA Filename: Soil Sampling (General Procedures)



JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
7	Packing samples in cooler(s)	Bottle breakage; Contaminant exposure; Cuts; Pinch points; Back strain; Lost time due to incorrect sample packaging or hold time exceedances	<ul style="list-style-type: none">• Wear nitrile gloves when handling sample containers. Pack glass containers in bubble wrap. Check COC against sample labels and SSOW for accuracy before shipping.• Avoid placing hands/fingers in pinch point locations (e.g. between cooler and lid).• Use proper lifting techniques and buddy system if needed.• Ensure equipment and supplies are loaded correctly and do not shift during transport.	Sampling Technician
8	Investigation derived waste (IDW) management	Contaminant exposure; Heavy lifting; Pinch points; Slips/trips/falls; Mislabeled waste	<ul style="list-style-type: none">• Wear nitrile gloves when handling IDW.• Use proper lifting techniques to transport/dispose of IDW into drums and use buddy system if needed.• Avoid placing hands/fingers in pinch point locations.• Maintain awareness of walking surfaces.• Label IDW with generator, a contact number, identification of contents, and site location. Specify IDW as either hazardous or non-hazardous material.	Sampling Technician

¹ Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: JSA Stump Grinder Operations



Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	May 7, 2008	JSA Type	Construction
Work Type	Environmental Construction	Client	HIMCO Site Trust
Work Activity	Grinding Stumps/basic use procedures; and refueling equipment		
Work Site	Elkhart, Indiana		
Key Equipment	Skid Steer Stump Grinder Attachment		
Task-specific Training	Heavy equipment operation, grinder attachment		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
<input checked="" type="checkbox"/> REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input type="checkbox"/> OTHER* _____
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input type="checkbox"/> OTHER* _____
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Class II reflective vest, leather gloves			

Development Team	Position/Title	Reviewed By	Position/Title	Date
1. Jeff Maranciak	RHSM			
2. Don Osterhout	PM			
3. Steve Corning	Site Supervisor			



Job Safety Analysis (JSA)

JSA Filename: JSA Stump Grinder Operations



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	1. Perform STAR Process- Refer to the equipment manufacturer's operating manual before using any machinery	Slips, trips, falls; situational risks - use STAR; short service employees	<ul style="list-style-type: none">• Verify personnel training is sufficient for scheduled task(s). Is Job Instruction (hands-on) Training necessary?	All Personnel
2	Daily inspection report while inspecting machine	Equipment problems; PPE failure	<ul style="list-style-type: none">• Don all necessary PPE; trained on inspection procedures.	Skid Steer Operator
3	Transporting the equipment to the work area	Backing into or running over objects	<ul style="list-style-type: none">• Walk around the equipment or use a spotter when necessary.	Skid Steer Operator
4	Hooking up to the necessary attachment	Cuts; pinched fingers/limbs	<ul style="list-style-type: none">• Don all necessary PPE; use a spotter to help hook up the attachment. Shut down equipment when hooking up hydraulic hoses.	Skid Steer Operator and laborer
5	Operating equipment-after making sure area is cleared of all unnecessary personnel	Flying debris from stump grinding ; running over unseen objects; backing into objects	<ul style="list-style-type: none">• Don all necessary PPE; keep attachments as close to the ground as possible; shut down operation and use a spotter when needed. Keep personnel 300' or more from grinding operations.	Skid Steer Operator and laborer
6	Shut down and exiting of equipment	Slips, trips, falls; situational risks - use STAR	<ul style="list-style-type: none">• Keep all attachment on the ground when the machine is not running; maintain three points of contact when entering or exiting.	Skid Steer Operator

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² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".



Job Safety Analysis (JSA)

JSA Filename: JSA 18" Tree Chipper



Safety Means Awareness
Responsibility Teamwork

Field staff must review job-specific work plan and coordinate with project manager to verify that all up-front logistics are completed prior to starting work including, but not limited to, permitting, access agreements and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Assess, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. CRA personnel have the authority and responsibility to use **Stop Work Authority**.

Date Issued/Revised	May 8, 2007	JSA Type	Construction
Work Type	Environmental Construction	Client	HIMCO Site Trust
Work Activity	Feeding the 18" Chipper with logs and brush		
Work Site	Elkhart, Indiana		
Key Equipment	Chipper; first aid kit; fire extinguisher		
Task-specific Training	Orientation on chipper operation; fueling equipment,		

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE JOB STEPS FOR TASK-SPECIFIC REQUIREMENTS)			
REFLECTIVE VEST*	<input type="checkbox"/> GOGGLES	<input type="checkbox"/> APR: _____*	<input checked="" type="checkbox"/> GLOVES*
<input checked="" type="checkbox"/> HARD HAT	<input type="checkbox"/> FACE SHIELD*	<input type="checkbox"/> SUPPLIED AIR RESPIRATOR*	<input type="checkbox"/> COVERALLS*
<input type="checkbox"/> LIFELINE / HARNESS*	<input checked="" type="checkbox"/> HEARING PROTECTION*	<input type="checkbox"/> PPE CLOTHING*	<input checked="" type="checkbox"/> OTHER* <u>Chainsaw Chaps</u>
<input checked="" type="checkbox"/> SAFETY GLASSES	<input checked="" type="checkbox"/> STEEL TOED BOOTS	<input type="checkbox"/> OTHER* _____	<input checked="" type="checkbox"/> OTHER* <u>Properly Fitted Clothing</u>
ADDITIONAL PPE: * Provide specific type(s) or descriptions of this item below			
Protective hard toe type logging boots, Face Protection, Gloves - Leather			

Development Team	Position/Title	Reviewed By	Position/Title	Date
1. Jeffrey Maranciak	RHSM			
2. Don Osterhout	PM			
3. Steve Corning	Site Supervisor			



Job Safety Analysis (JSA)

JSA Filename: JSA 18" Tree Chipper



Safety Means Awareness
Responsibility Teamwork

JOB STEPS ⁽¹⁾	TASK ACTIVITY	POTENTIAL HAZARD(S) ⁽²⁾	CORRECTIVE MEASURE(S) ⁽³⁾	Person Responsible
1	Perform STAR Process - Refer to the chippers manufacturer's operators manual before operating any chipper	Slips, trips, falls; situational risks - use STAR	<ul style="list-style-type: none"> Verify personnel training is sufficient for scheduled task(s). Is Job Instruction (hands-on) Training necessary? Review JSA Chipper Operations- General prior to beginning operations. 	All Personnel
2	Inspect and use equipment and PPE	Equipment failure; PPE failure	<ul style="list-style-type: none"> Don all necessary PPE; training on inspection procedures. 	All Personnel
3a	Setting up for chipping operations - clear the area around the chipper of brush and other obstructions	Cuts; poisonous plants; biting/stinging insects; poisonous snakes; wind; slippery conditions	<ul style="list-style-type: none"> Inspect the area for hazards. Train personnel on hazard recognition which includes identifying animals, plants, and hazardous situations. 	Chipper Operator
3b	Continue area setup - inspect each tree noting lean; limbs; shape; crook; wind direction; butt defects; dead, lodged limbs	Cuts; poisonous plants; biting/stinging insects; poisonous snakes	<ul style="list-style-type: none"> Inspect the area for hazards. Train personnel on hazard recognition which includes identifying animals, plants, and hazardous situations. Observe and allow for hazards in surrounding area which may be triggered by chipping procedures. 	Chipper Operator
4	Have the skid bring the logs and brush to be chipped into position. JSA Chipping Operations- General	General chipping hazards; tree kickbacks; tree jamming; slippery conditions; flying debris	<ul style="list-style-type: none"> Review JSA Chipping Operation - General. 	Chipper Operator
5	After tree has been inserted into the chipper have personnel move away to ensure that pinch points and grab points are clear	General chipping hazards; slippery conditions	<ul style="list-style-type: none"> Always keep to the side of tree being chipped. NEVER TURN YOUR BACK ON THE MACHINE WHILE THE TREE IS BEING CHIPPED. Do not allow personnel within 300' feet of chipper operations. 	Chipper Operator/ Equipment Operator
6	Inspect area for potential hazards (whip hazards, lodged trees, biting/stinging insects nests, etc.)	Cuts; sprains/strains; slips/trips/falls; hazards from other equipment; biting insects	<ul style="list-style-type: none"> Never leave a tree in the chipper because it may kick back or lodge in the chipper unexpectedly. Never work in the area of a lodged tree. 	Chipper Operator and Site Supervisor

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² A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress / ergonomics / lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught"

³ Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

B

ATTACHMENT B

FORMS

- TRAINING ACKNOWLEDGMENT FORM
- DAILY SAFETY MEETING LOG

TRAINING ACKNOWLEDGMENT FORM

I have attended the mandatory Site-specific initiation session and understand the information presented in the HASP. I fully understand the known potential hazards present on Site, the required levels of PPE to complete my work, and the emergency procedures for the Site. I further confirm that I have the required training to participate in the Work Plan activities that I will be involved with. I agree to work in accordance with the guidelines presented in the HASP and I understand that failure to do so could result in removal from the Site.

<i>Date</i>	<i>Printed Name</i>	<i>Signature</i>	<i>Position</i>	<i>Company Name</i>

DAILY SAFETY MEETING LOG

PROJECT: _____ LOCATION: _____

DATE/TIME: _____

[illegible]